

# ECS SDP Internal Training

# Objectives



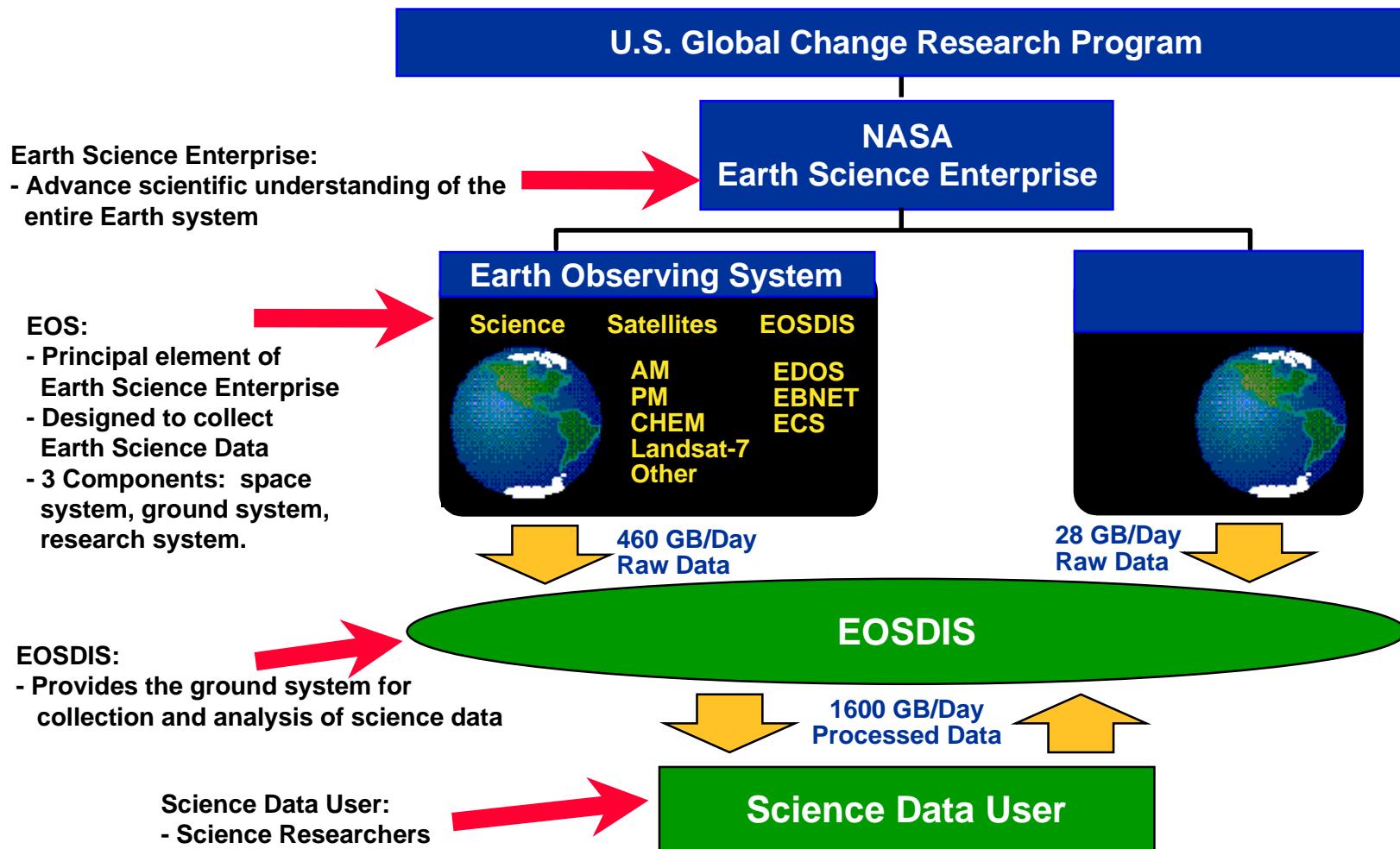
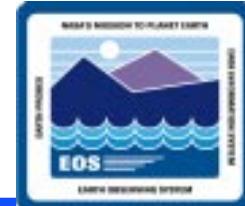
- **Overall objective: Describe ECS structure and function for Science Data Processing (SDP)**
  - Identify subsystems and Computer Software Configuration Items (CSCIs)
  - Specify major components and functions/processes of CSCIs
  - Describe role of CSCIs/functions/processes in the context of ECS operational scenarios
    - ASTER-specific functions (e.g., DAR, expedited data support)
    - Producing and distributing data products (including media)
    - Updating QA metadata
    - On-demand processing workaround
    - User registration
    - Landsat data insertion and access

# What This Lesson Is (and Is Not)

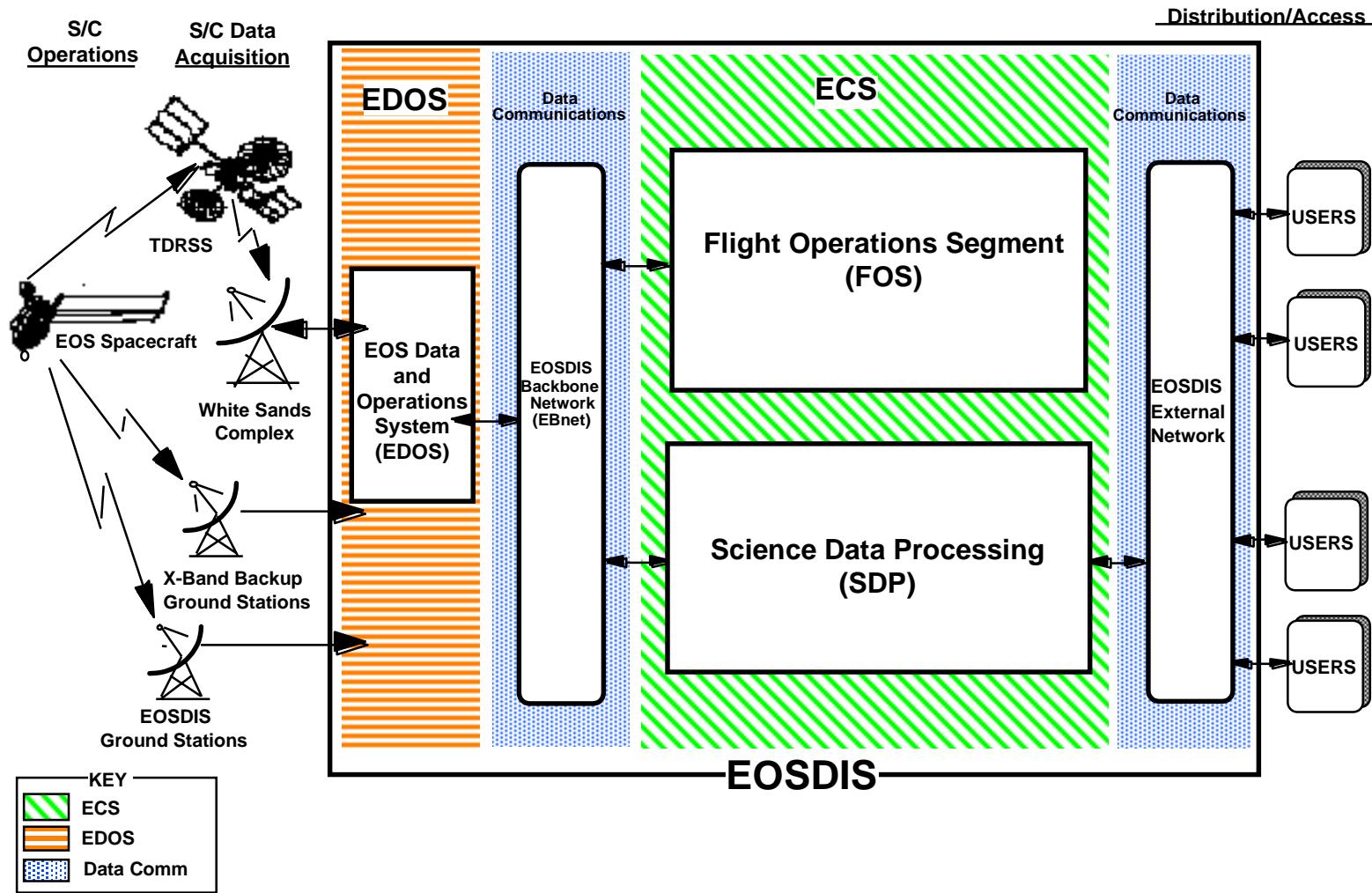


- **Is**
  - Brief illustration of ECS high-level structure
  - Introduction to subsystems that make up ECS at a site
  - Examination of each subsystem and its Computer Software Configuration Items (CSCIs), with components
    - Introduction of all system elements and brief description of functions
    - Background for subsequent scenario-based presentation of system functional flows
  - Detailed look at system functioning in the context of operational scenarios
- **Is Not**
  - Full description of overall ECS structure and function
  - Description of specific individual ECS entities (e.g., SMC)
  - Software development lesson
  - Complete description of interfaces and event sequences
  - Operations training

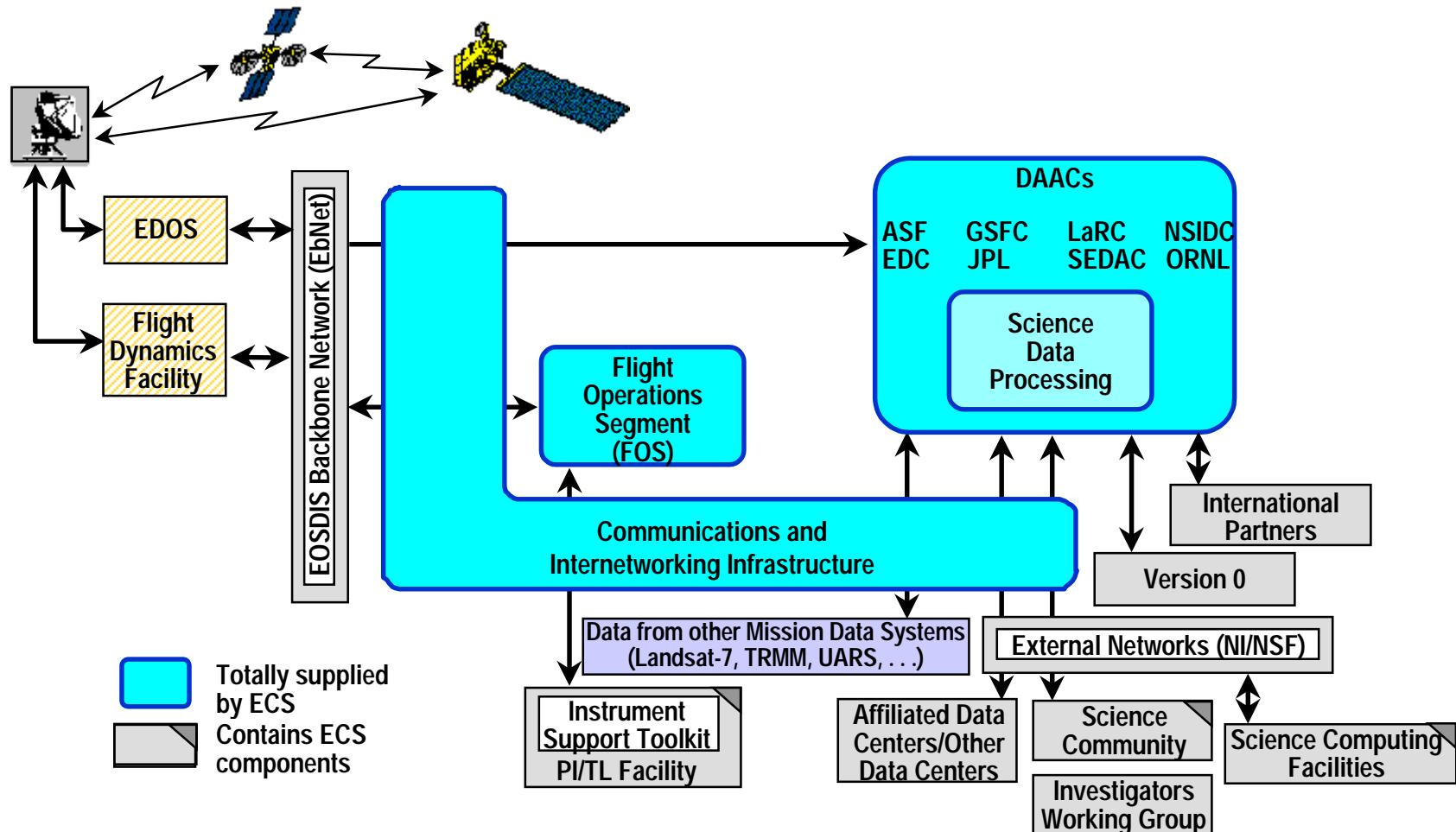
# Program Overview



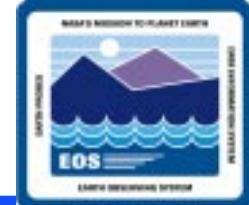
# EOSDIS Principal Components



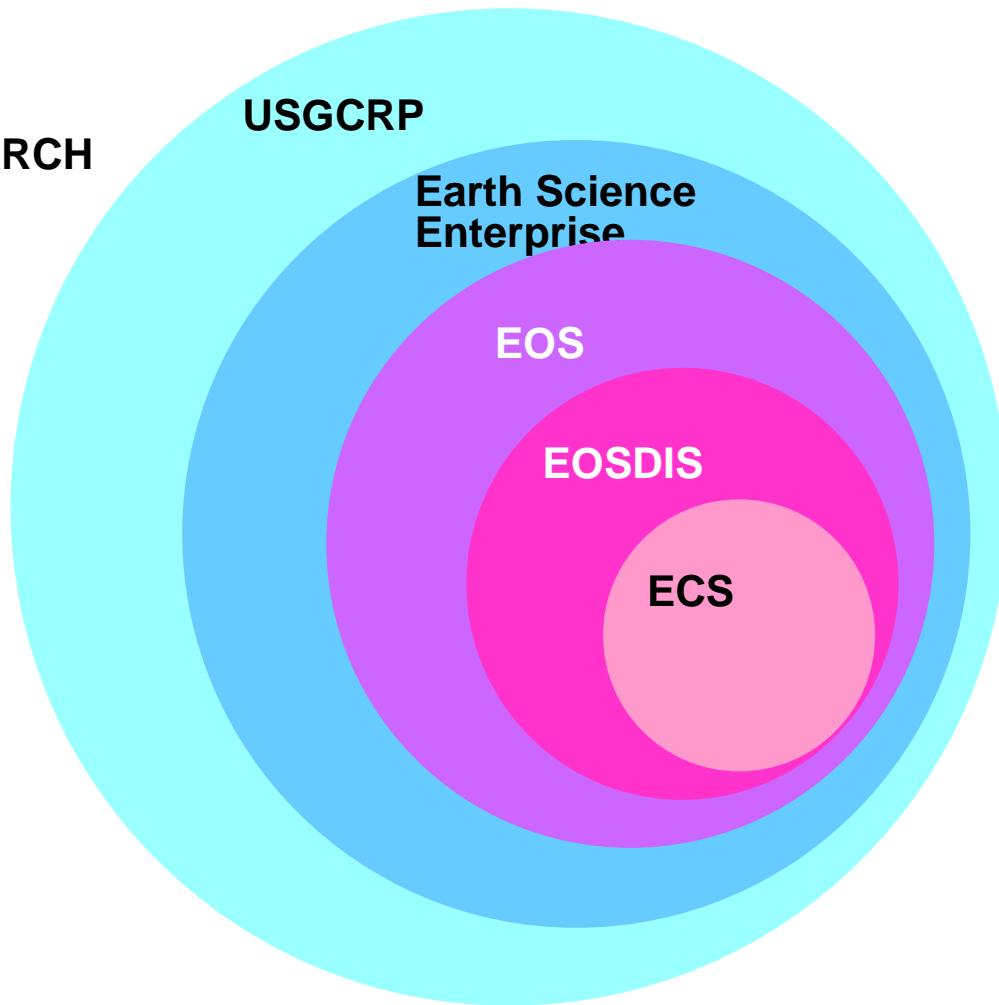
# EOSDIS Data Flow



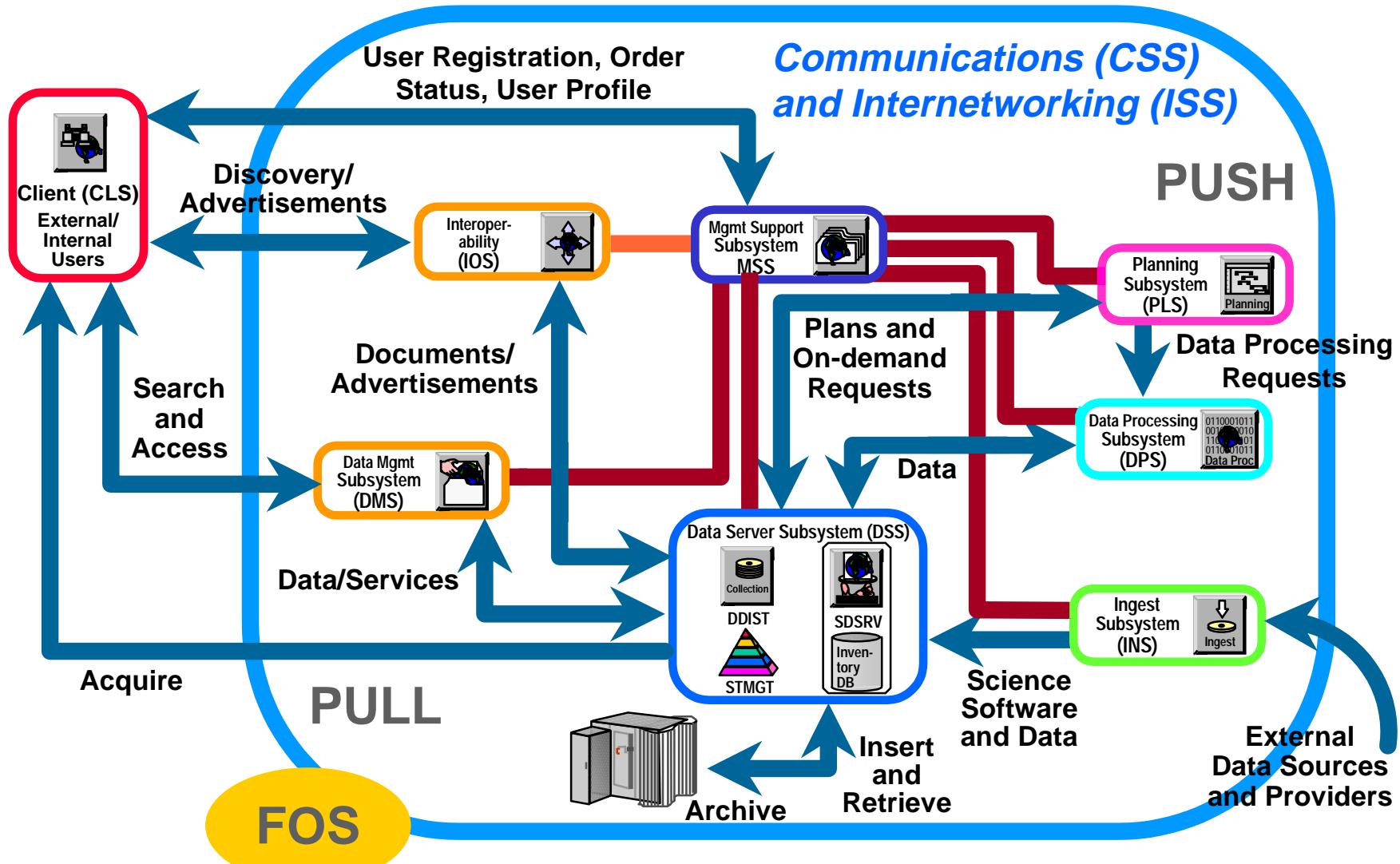
# Relationship of ECS to Global Change Research



WORLDWIDE  
GLOBAL CHANGE RESEARCH



# ECS Context



# Subsystems and Functions



- **Data Server Subsystem (DSS)**
  - Data storage and management: archive science data (with related insert, search and retrieve functions), archive management, data resource staging
- **Ingest Subsystem (INS)**
  - Interface with external data providers and transfer data into ECS (with related staging functions and operator interfaces)
- **Data Processing Subsystem (DPS)**
  - Dispatches and monitors execution of science software
- **Planning Subsystem (PLS)**
  - Long- and short-term planning of science data processing, and management of production resources

# Subsystems and Functions (Cont.)



- **Client Subsystem (CLS)**
  - Provides interfaces and access for external users
- **Data Management Subsystem (DMS)**
  - Enables cross-site data search and retrieval; gateways for interface of ECS with Version 0 IMS protocol
- **Interoperability Subsystem (IOS)**
  - Advertising Service (with WWW user interface); support for other subsystems in locating data or DSS services
- **System Management Support Subsystem (MSS)**
  - System maintenance, management, and administration (includes trouble ticketing, baseline and configuration management, fault and performance monitoring, and user account management and order tracking)

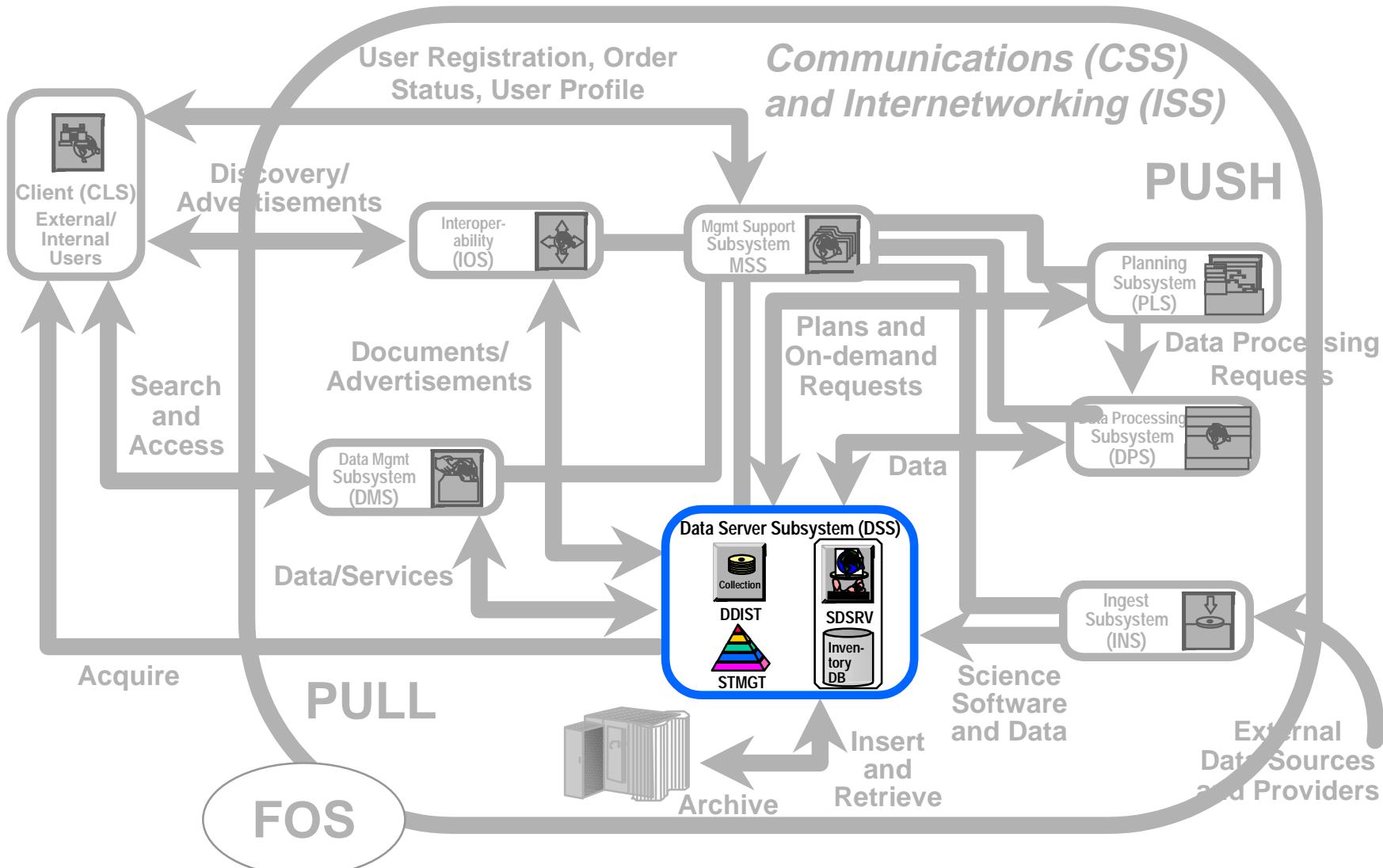
# Subsystems and Functions (Cont.)



- **Communications Subsystem (CSS)**
  - General system infrastructure functions (includes DCE and network communications, libraries to standardize software mechanisms, application error handling, interfaces to e-mail, file transfer and network file copy functions)
- **Internetworking Subsystem (ISS)**
  - Networking hardware devices and embedded software

***NOTE: The ISS is part of the ECS infrastructure and is not addressed in detail in this course.***

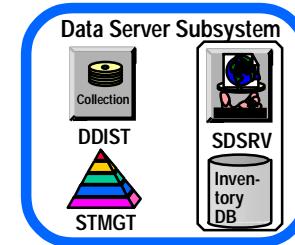
# Subsystems and CSCIs: DSS



# Subsystems and CSCIs: DSS (Cont.)



- **Data Server Subsystem (DSS)**
  - Provides capabilities to store, search, retrieve, and distribute earth science and related data
  - Client-server information transfer is by commands and requests
  - Uses Universal References to identify ECS entities
    - GranuleUR: represents a granule in the data server (e.g., as follows)



UR:10:DsShESDTUR:UR:15:DsShSciServerUR:13:[GSF:DSSDSRV]:16:SC:MOD10\_L2:1411

- DsServerUR: represents a specific running data server application (e.g., [GSF:DSSDSRV] )
- Uses MSS Event services to log system-level events
- Interfaces with virtually all ECS subsystems and components

# Subsystems and CSCIs: DSS (Cont.)

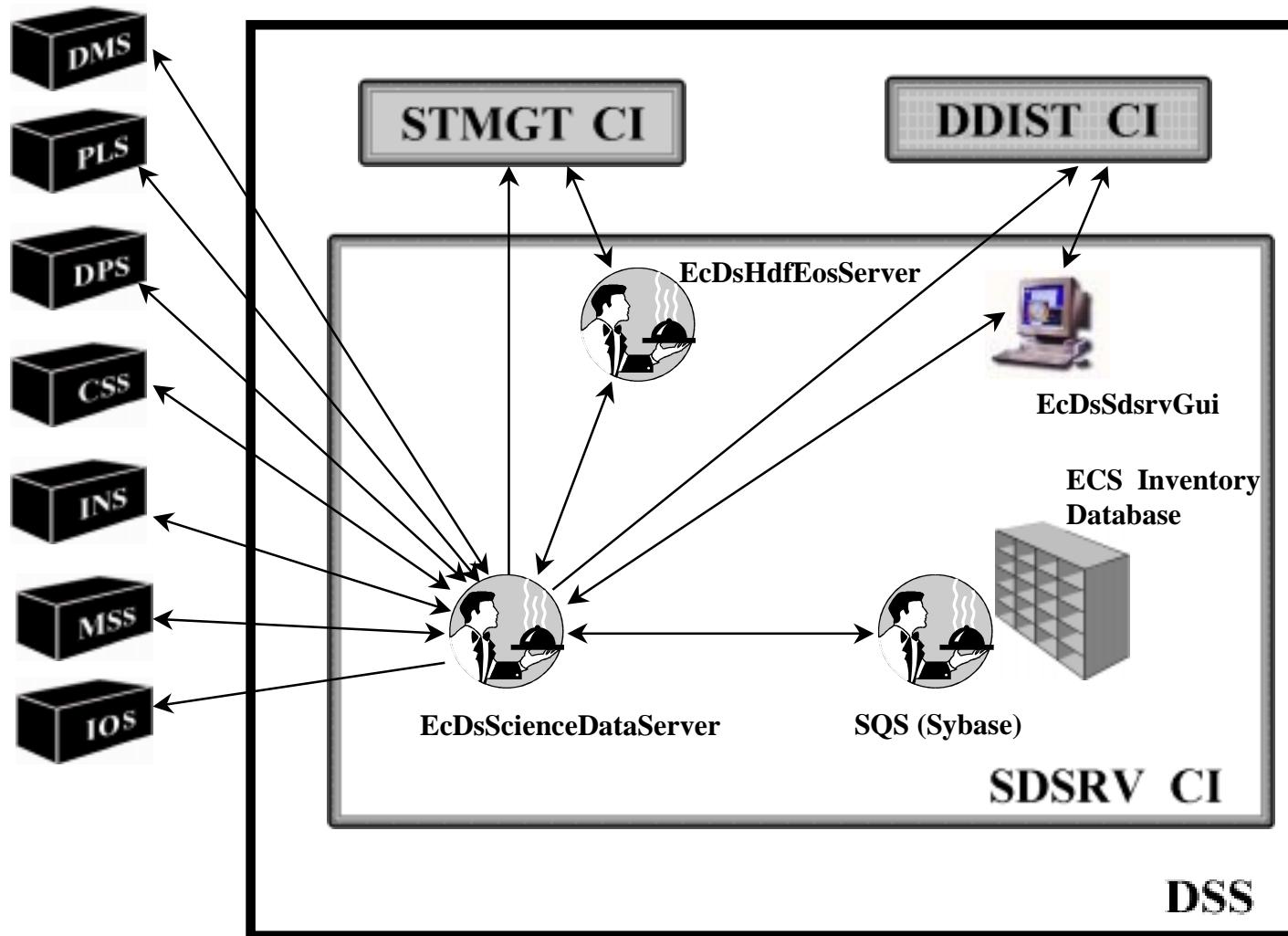


- **Science Data Server (SDSRV) CSCI**
  - Provides the ECS with a catalog of Earth Science Data holdings, and the Earth Science Data Type (ESDT) services that operate on the data
  - Manages and provides user access to data collections through its catalog of metadata and mechanisms to acquire data from the archive
  - Four major components
    - **Science Data Server** - services requests for storage, search, retrieval, and manipulation of science data
    - **HDF EOS Server** - provides science data subsetting
    - **Science Data Server GUI** - provides operator interface
    - **Sybase/SQS Server** - manages catalog (metadata)



# Subsystems and CSCIs: DSS (Cont.)

## SDSRV Architecture and Interfaces



# Subsystems and CSCIs: DSS (Cont.)

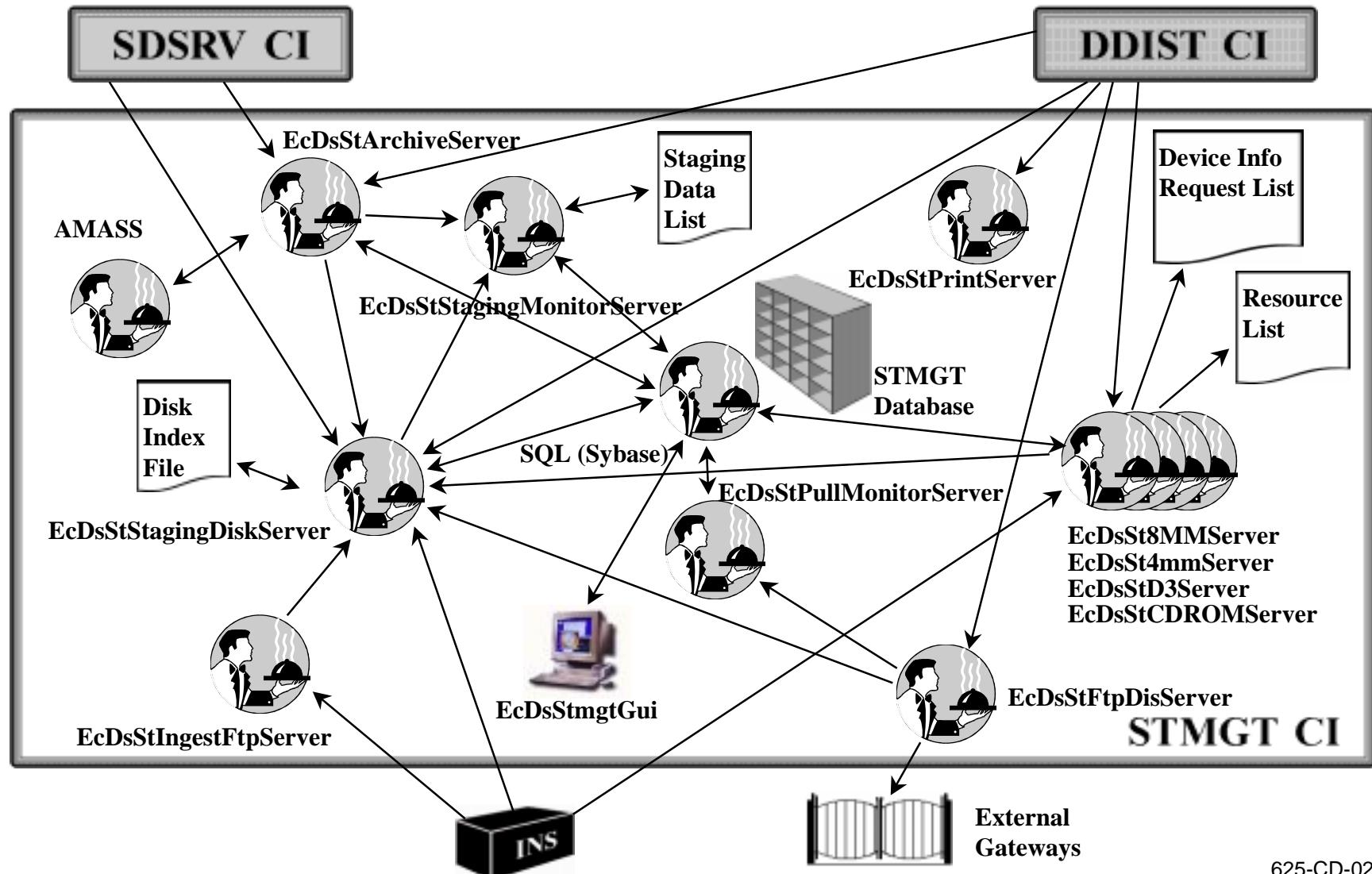


- **Storage Management (STMGT) CSCI**
  - Stores, manages, and retrieves data files on behalf of other science data processing components
  - Five major components
    - **Archive Server** - provides access to stored data
    - **Staging Monitor** - manages the group of data files that have been retrieved from the archive and placed into a cache area on staging disk
    - **Resource Manager** - schedules access to shared peripheral devices
    - **Pull Monitor** - manages files in the user pull area, deleting them as they are retrieved by users or as their time-out periods expire
    - **Data Base** - contains data tables for STMGT devices, cache management, event and log management, requests, and related functions

# **Subsystems and CSCLs: DSS (Cont.)**



# STMGT Architecture and Interfaces



# Subsystems and CSCIs: DSS (Cont.)

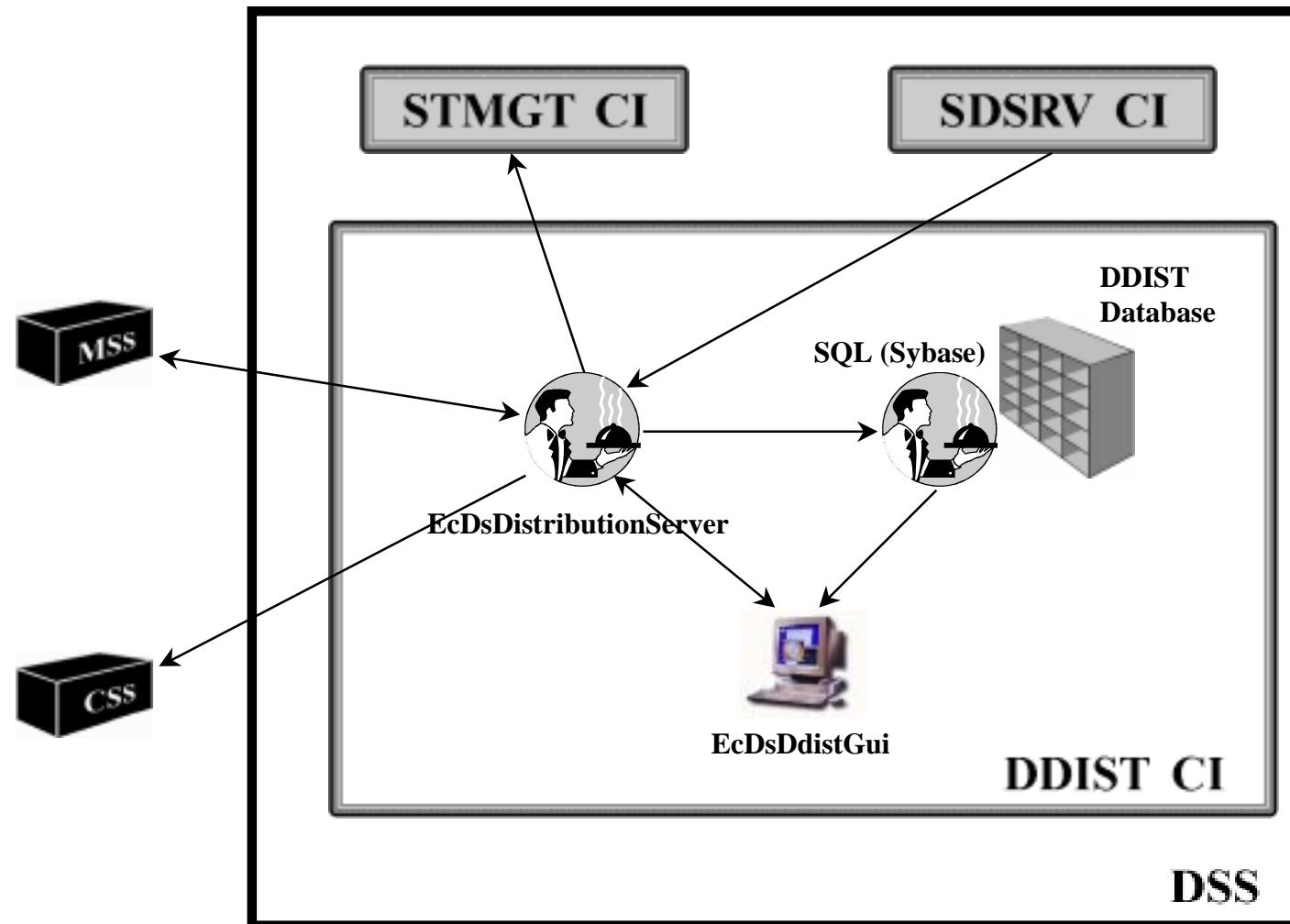


- **Data Distribution (DDIST) CSCI**
  - Formats and distributes data to users, either electronically or on physical media (e.g., 8mm tape cartridges)
  - Three major components
    - **Data Distribution Server** - provides control and coordination for data distribution through request processing
    - **Data Distribution GUI** - allows operations staff to initiate, track, and manipulate distribution requests
    - **Data Base** - contains the request list; updates and provides the request configuration

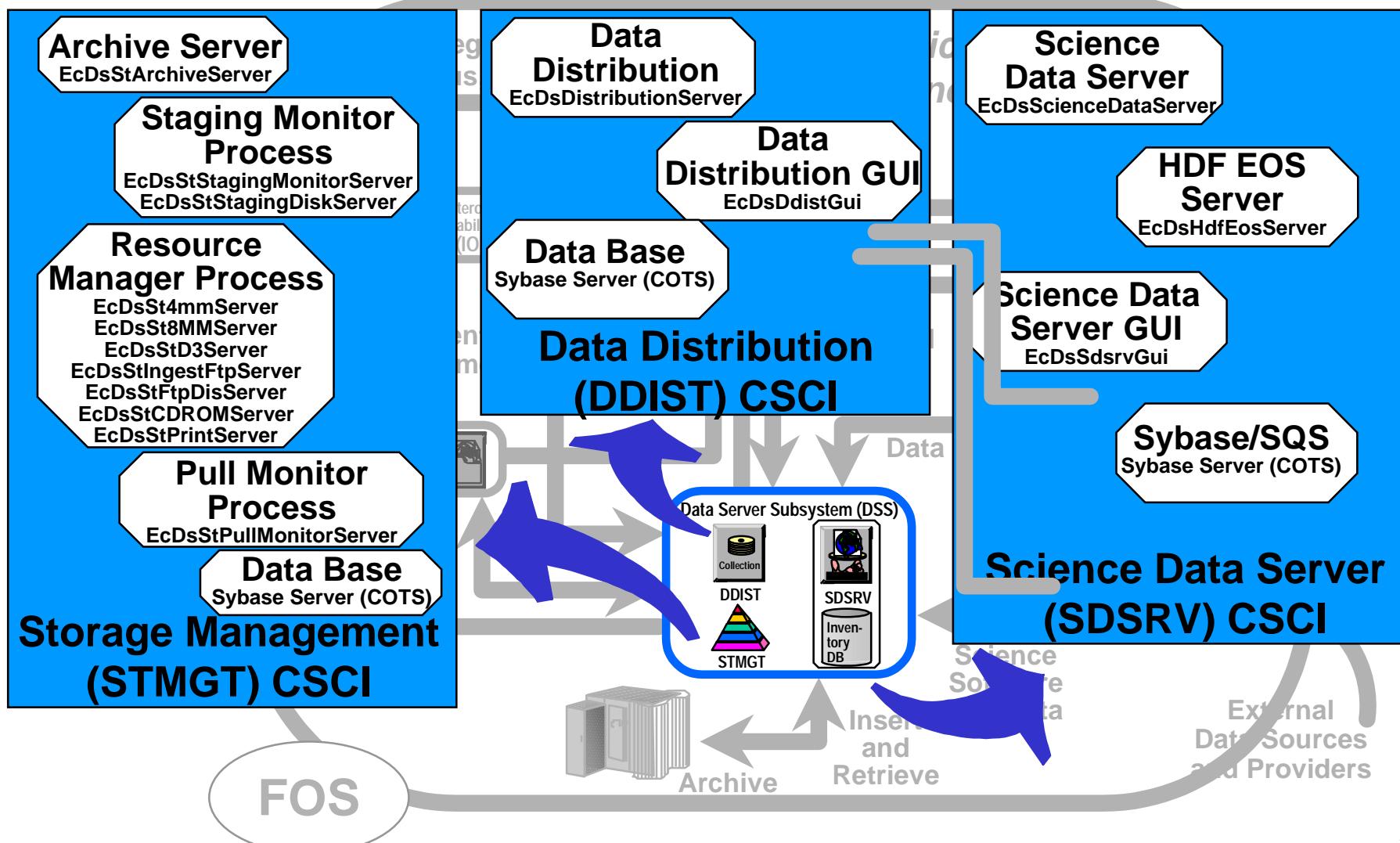


# Subsystems and CSCIs: DSS (Cont.)

## DDIST Architecture and Interfaces



# Subsystems and CSCIs: DSS (Cont.)



# Subsystems and CSCIs: INS



- **Ingest Subsystem (INS)**



- Transfer of data into ECS in accordance with approved ICDs
- Supports varied data formats and structures
- *Ingest Client*: A set of ingest software configured for requirements of a specific situation
- Ingest clients perform data preprocessing, metadata extraction, and metadata validation on incoming data
- Data staged to one of two areas
  - Level 0 (L0) data from ongoing missions, and EDOS ancillary data, staged to INS working storage area
  - Non-L0 data (e.g., non-EDOS ancillary data, L1A-L4 data) staged directly to DSS working storage area
- Uses several COTS tools: RogueWave class libraries, Sybase relational database, Netscape Enterprise Server/ Browser, Tivoli Client, DCE Client, DCE Driver, MSAccess, HP OpenView Client

# Subsystems and CSCIs: INS (Cont.)



- **Ingest (INGST) CSCI**
  - Acquires data by various methods and transfers the data into ECS
    - Automated transfer: in response to notification from the data provider, Ingest transfers the data from a specified network location
    - Polling: transfer of data from predetermined network locations which Ingest periodically checks for new data
      - With Delivery Record
      - Without Delivery Record
    - Interactive: data acquisition in “real time” over the Internet using a Hyper Text Markup Language (HTML) form
    - Media: reading data from tapes
  - Stores and manages request information
  - Provides for data preprocessing and insertion

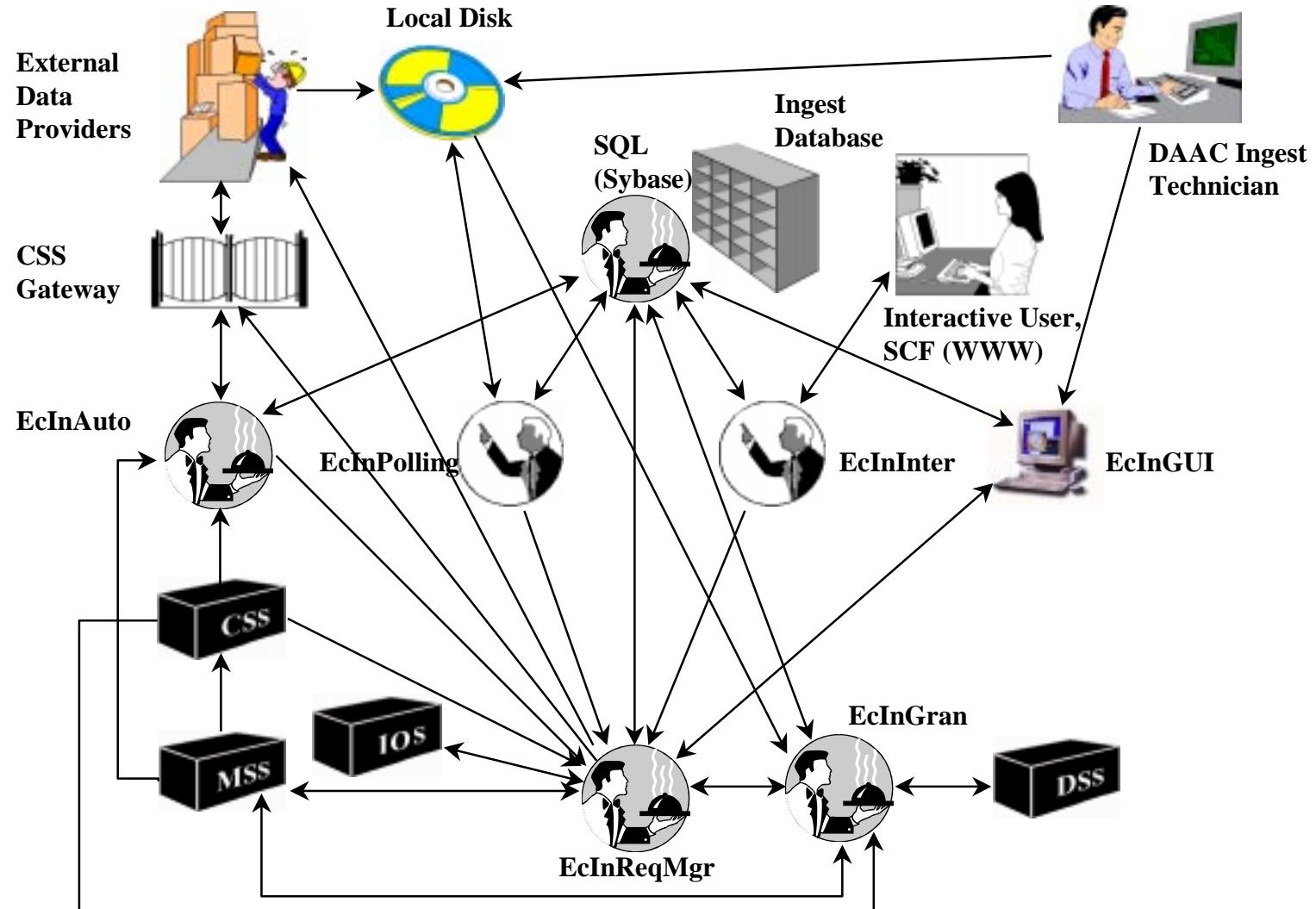
# Subsystems and CSCIs: INS (Cont.)



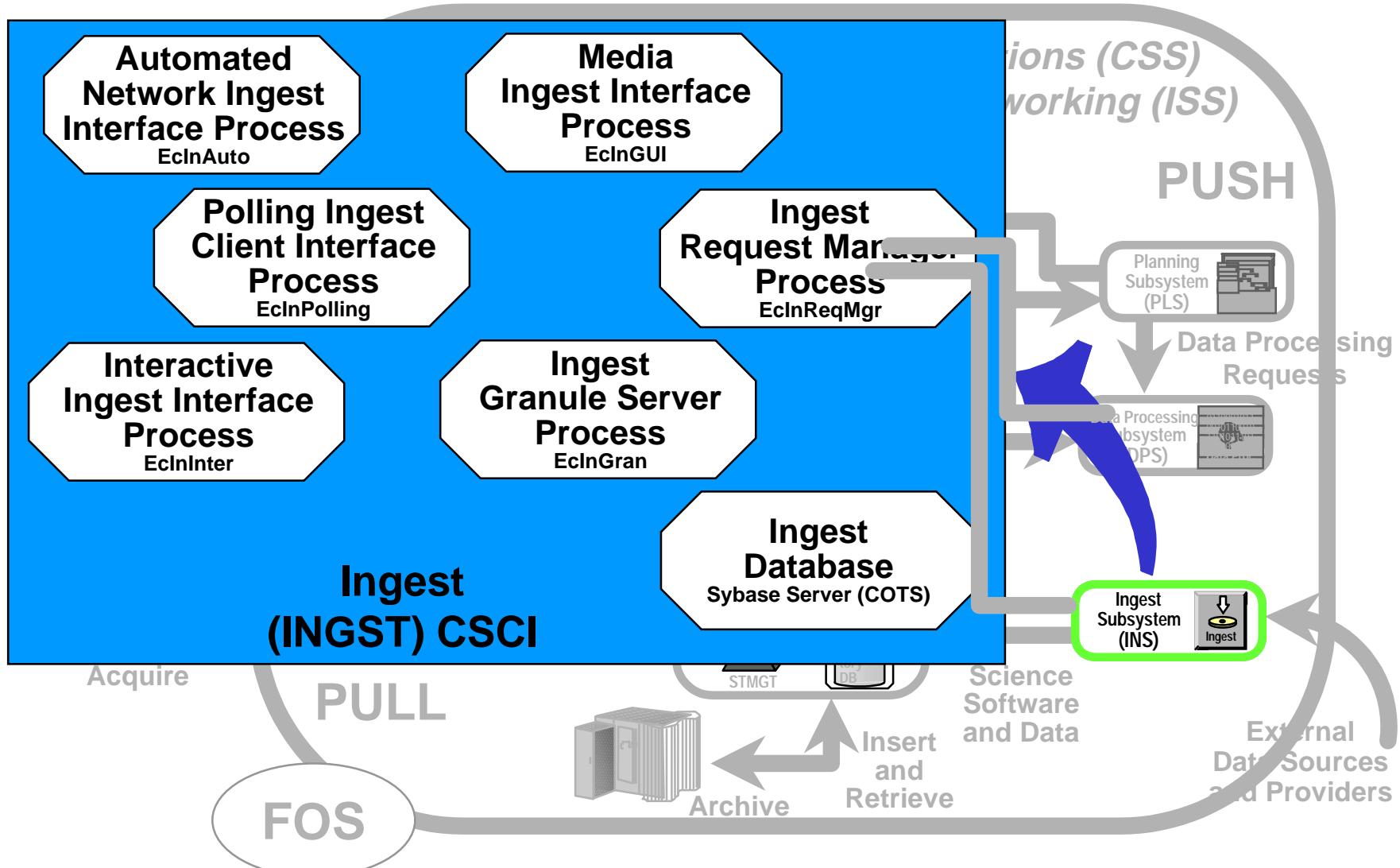
- **Ingest (INGST) CSCI (Cont.)**
  - Seven major components
    - **Automated Network Ingest Interface** - provides basic capability to ingest data electronically from an external source
    - **Polling Ingest Client Interface** - creates polling request, detects new files in a specified external location, creates and submits ingest request
    - **Interactive Ingest Interface** - provides science users and ECS operators the capability for interactive request to ingest data available on the network
    - **Media Ingest Interface** - provides operators ability to perform ingest from physical media
    - **Ingest Request Manager** - manages ingest request traffic and processing
    - **Ingest Granule Server** - provides services for required preprocessing of data and subsequent insertion into Data Server
    - **Ingest Database** - stores and provides access to Ingest Subsystem internal data (e.g., History Logs)

# Subsystems and CSCIs: INS (Cont.)

## Architecture and Interfaces



# Subsystems and CSCIs: INS (Cont.)

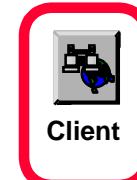


# Subsystems and CSCIs: CLS



- **Client Subsystem (CLS)**

- User access to ECS services and data, and other systems interoperable with ECS (e.g., Version 0)
- Includes a desktop manager in the user's local file space
- Includes applications programs accessible through user interfaces
  - User Registration Tool (URT)
  - B Zero Search and Order Tool (B0SOT)
  - EOSView
  - Data Acquisition Request (DAR) Tool
- Uses several COTS tools: Netscape Navigator, Netscape Enterprise Server, ESRI ArcInfo (performs spatial capability in the DAR Tool), XVT (widget set and development tool for EOSView), Interactive Data Language (IDL) (used in EOSView visualization features), and X/Motif (used on Sun platforms for the DAR Tool and Desktop)



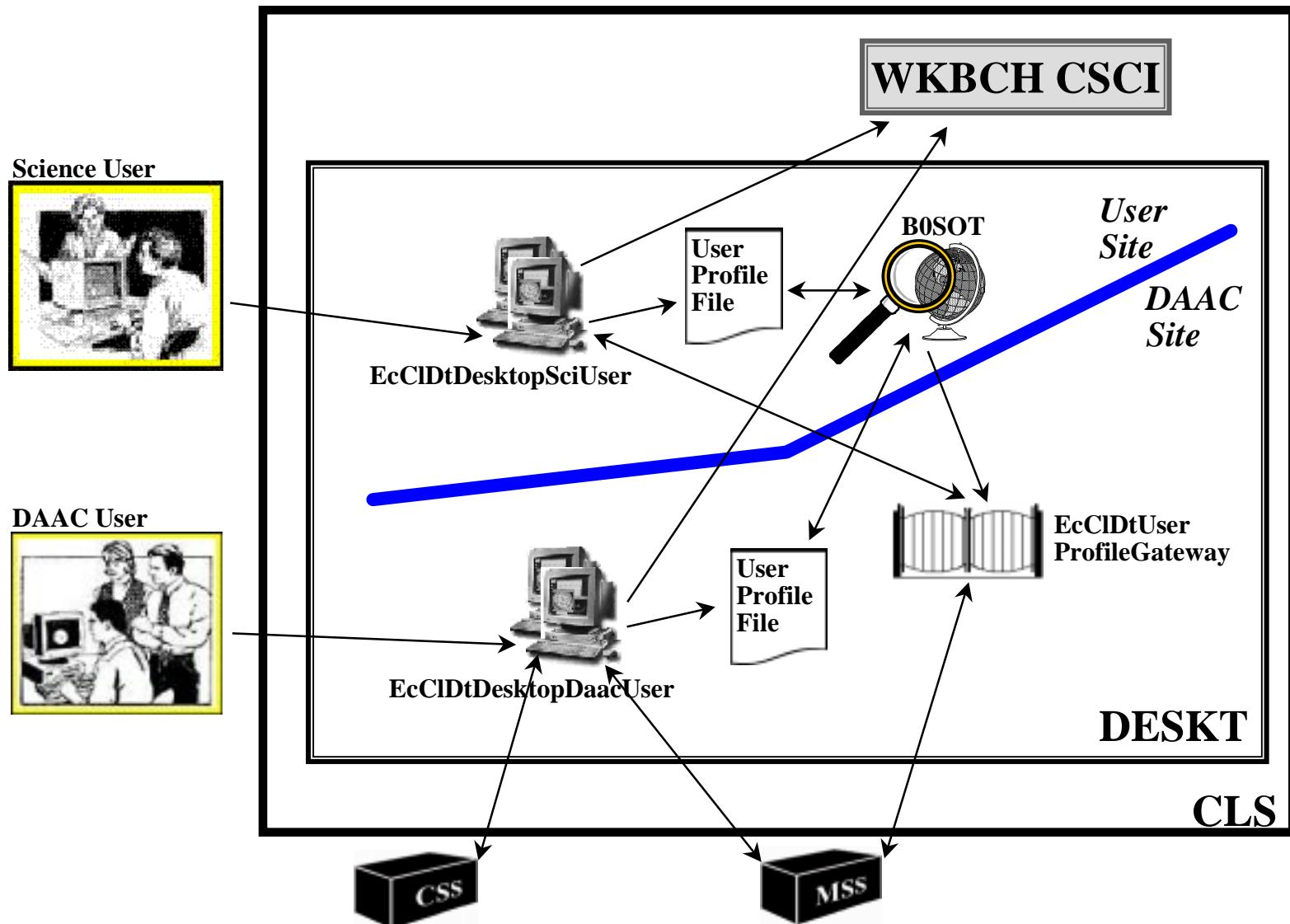
# Subsystems and CSCIs: CLS (Cont.)



- **Desktop (DESKT) CSCI**
  - Standardized Graphical User Interface (GUI) framework
  - Three major components
    - [Science User DESKT](#) - ECS access for science user
    - [DAAC Operations DESKT](#) - ECS access for operators (uses DCE for authentication and authorization)
    - [User Profile Gateway](#) - server in DESKT to provide User Profile information to the Science User Desktop
- **Workbench (WKBCH) CSCI**
  - Includes applications and libraries for access to ECS data and services
  - Version 2.0 includes 4 tools
    - [URT](#) (HTML-based)
    - [BOSOT](#) (X/Motif-based; V0 Motif Client ported to ECS)
    - [EOSView](#) (X/Motif-based)
    - [DAR Tool](#) (X/Motif-based)

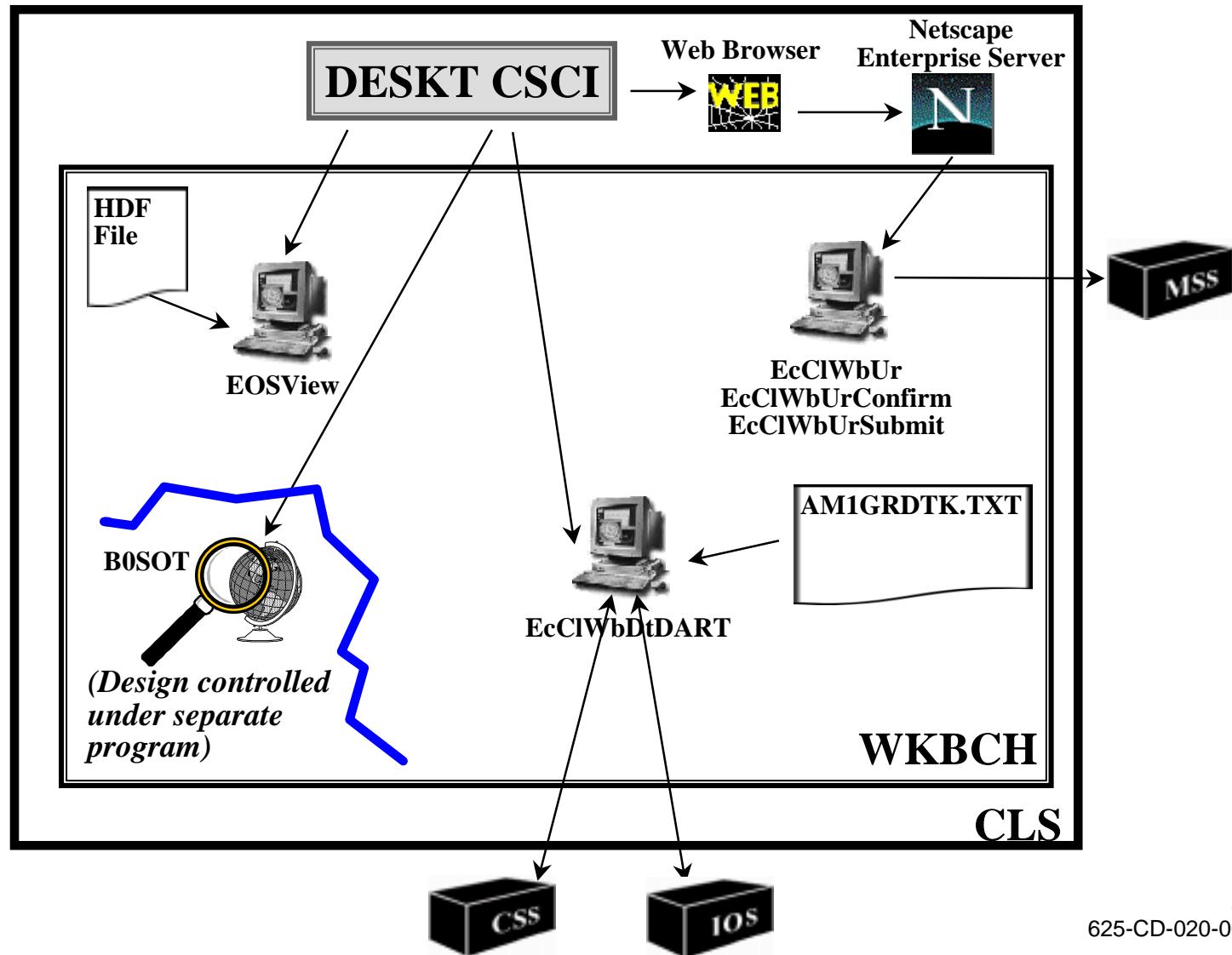
# Subsystems and CSCIs: CLS (Cont.)

## DESKT Architecture and Interfaces

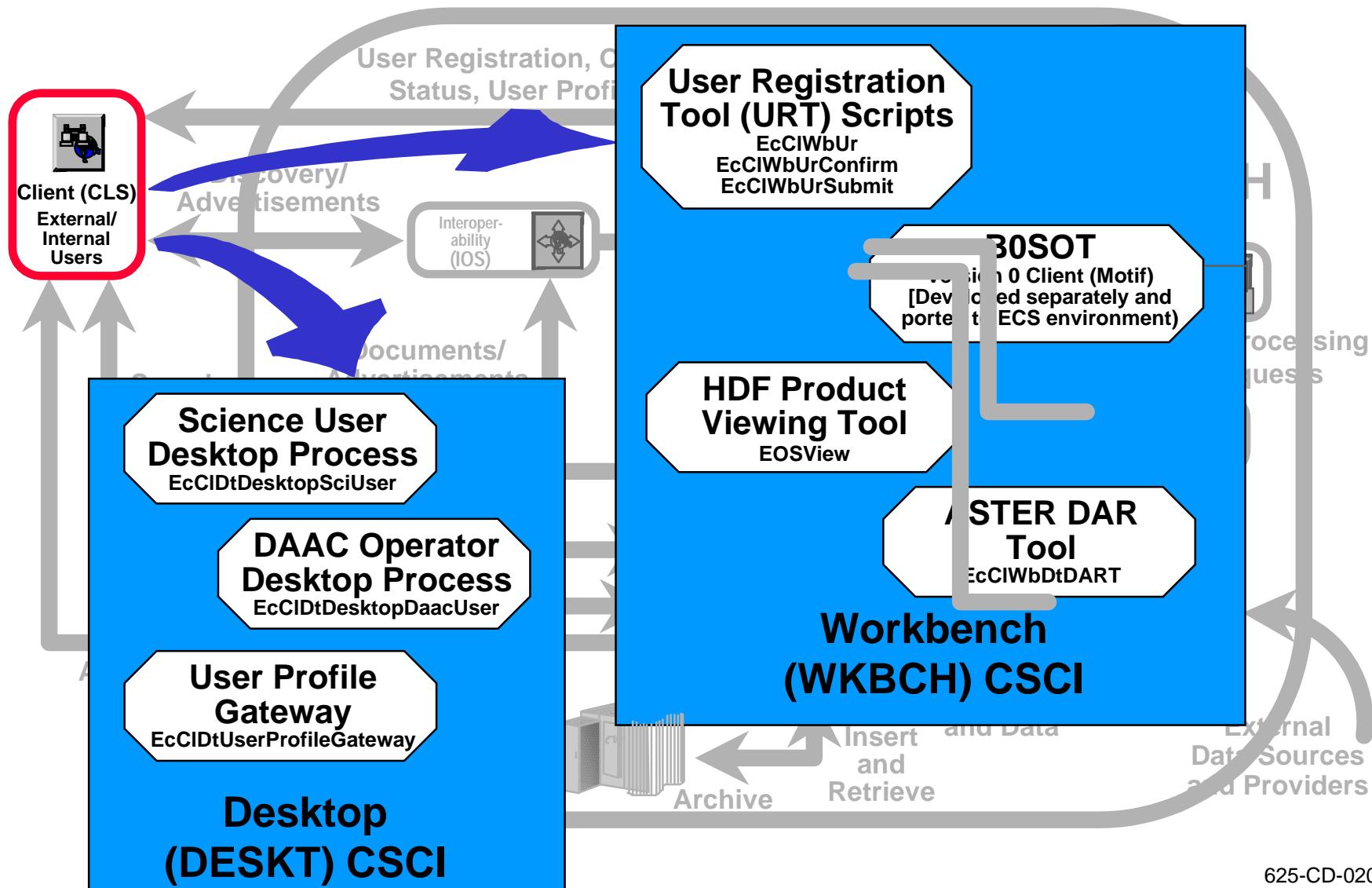


# Subsystems and CSCIs: CLS (Cont.)

## WKBCH Architecture and Interfaces



# Subsystems and CSCIs: CLS (Cont.)



# Subsystems and CSCIs: DMS



- **Data Management Subsystem (DMS)**
  - Provides catalog interoperability between ECS and the V0 Information Management Service (IMS) system and between DAACs
  - Supplies gateway processes and information managers that forward requests from users to storage locations
  - Maintains a Data Dictionary that stores data collection information (i.e., collection metadata, attributes, valid keywords)
  - Data Dictionary contains collection attribute and keyword mappings between ECS and V0 to permit translation of requests
  - Uses several COTS tools: RogueWave class libraries, Builder Xcessory (GUI builder tool), Sybase SQL Server (for Data Dictionary database search and update), Sybase Replication Server (for cross-DAAC distribution and consistency in Data Dictionary database information)

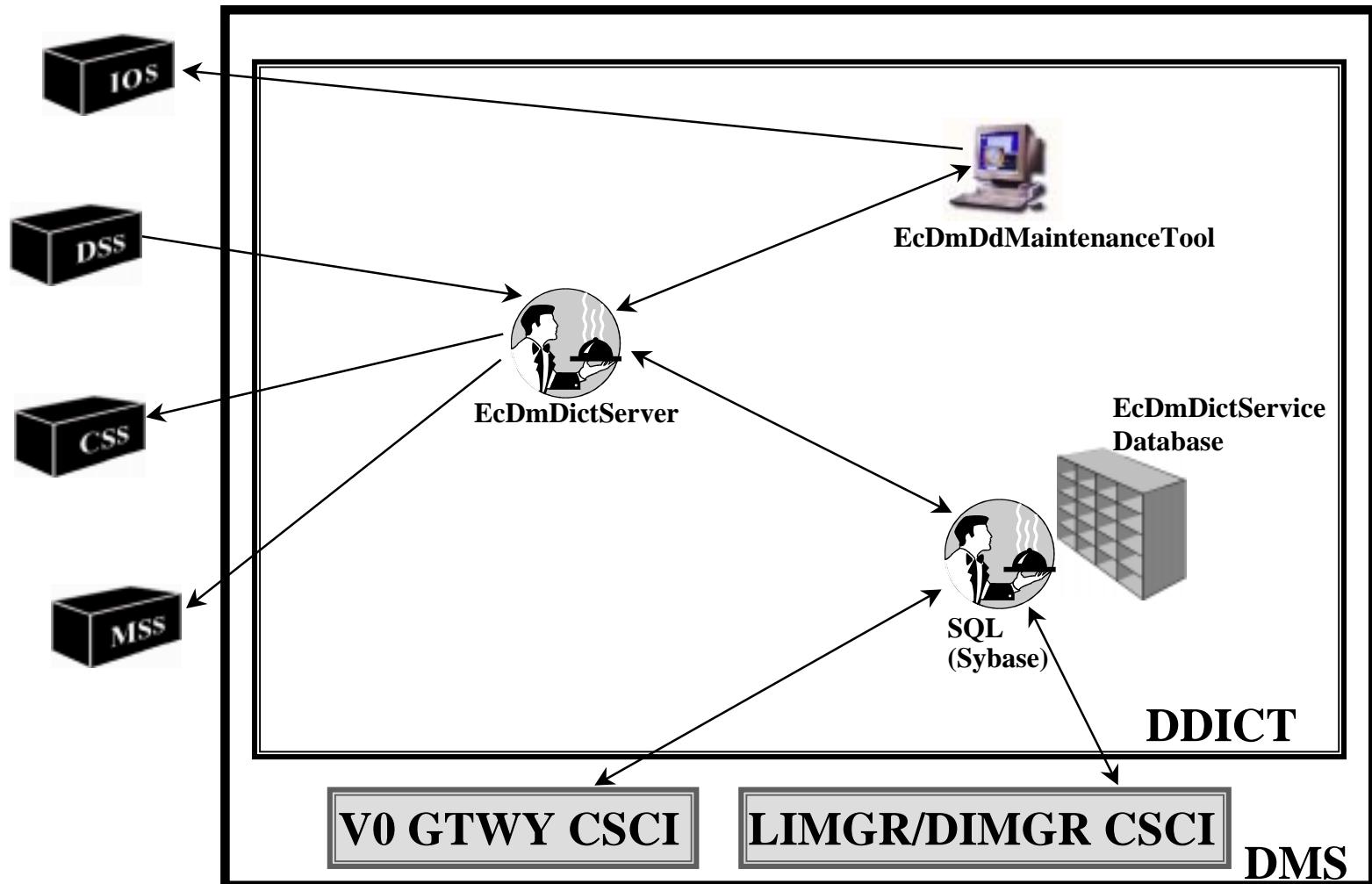
# Subsystems and CSCIs: DMS (Cont.)



- **Data Dictionary (DDICT) CSCI**
  - Manages definitions of data collections (including metadata, attributes, domains, and data locations)
  - Stored in a relational Database Management System (DBMS)
  - Four major components
    - **Data Dictionary Server** - provides DDICT client processes the ability to perform data searches, inserts, updates, or deletes to the DDICT database
    - **Data Dictionary Maintenance Tool** - provides a GUI to insert, update, or delete schema information held in the DDICT database, and allows operations staff to modify database attributes (e.g., valids, mapping)
    - **Data Dictionary SQL Server** - COTS database server
    - **Data Dictionary Replication Server** - COTS server at GSFC for consistent replication of DDICT across DAACs

# Subsystems and CSCIs: DMS (Cont.)

## DDICT Architecture and Interfaces



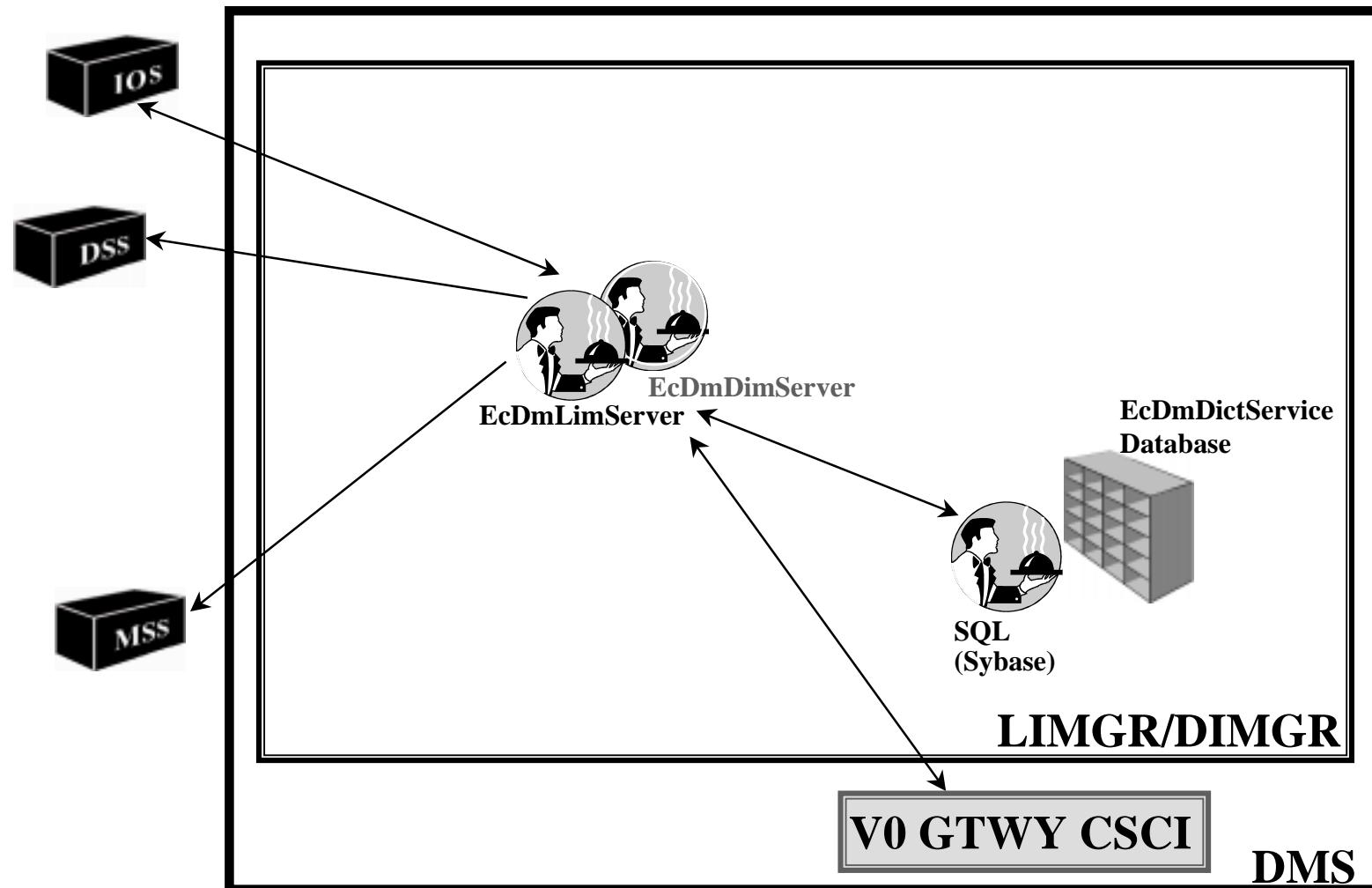
# Subsystems and CSCIs: DMS (Cont.)



- **Information Manager (LIMGR and DIMGR) CSCI**
  - Provide access to data and services at a site (through Local Information Manager, or LIMGR) and services across sites (through Distributed Information Manager, or DIMGR)
  - Accept requests (e.g., search) and produce and execute the corresponding requests required for the data servers for the site
  - Two components
    - **Local Information Manager (LIMGR)** - receives inventory search, browse, and acquire requests, matches them to data types identified in DDICT, and directs them to the appropriate server within a DAAC
    - **Distributed Information Manager (DIMGR)** - receives inventory search, browse, and acquire requests, matches them to data types identified in DDICT, and, if appropriate, forwards them to the appropriate server in another DAAC

# Subsystems and CSCIs: DMS (Cont.)

## L/DIMGR Architecture and Interfaces



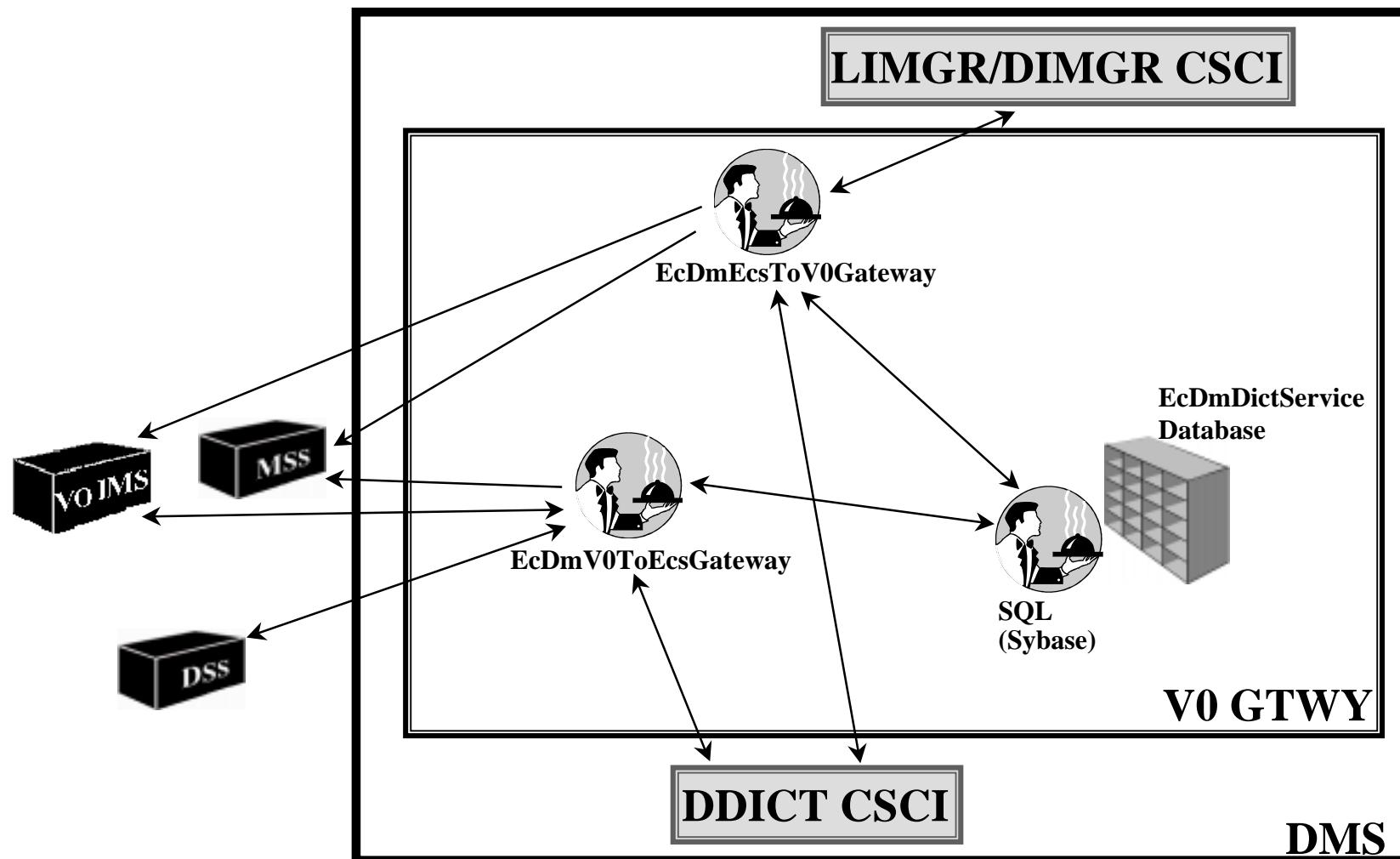
# Subsystems and CSCIs: DMS (Cont.)



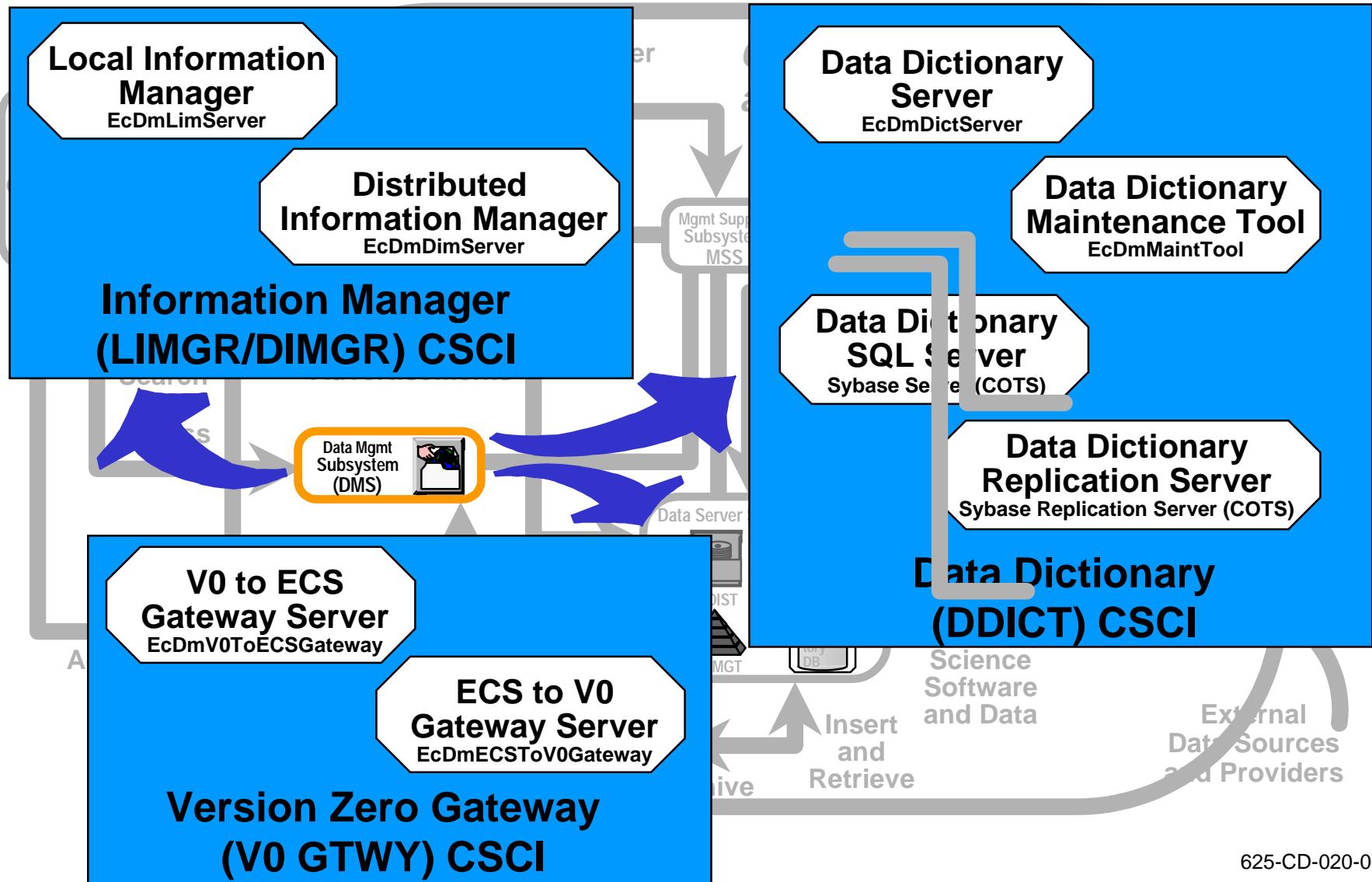
- **Version Zero Gateway (V0 GTWY) CSCI**
  - Provides access to data and services between the ECS Data Server and V0 IMS
  - Two components
    - **V0 to ECS Gateway Server** - allows users of the V0 IMS to search and request data and services defined within ECS
    - **ECS to V0 Gateway Server** - allows users of ECS to search and request data and services in the V0 data archive

# Subsystems and CSCIs: DMS (Cont.)

## V0 GTWY Architecture and Interfaces



# Subsystems and CSCIs: DMS (Cont.)



# Subsystems and CSCIs: IOS



- **Interoperability Subsystem (IOS)**
  - Allows ECS and non-ECS users to insert and subsequently search for Earth Science related services, providers, and data
  - Provides interfaces for supporting client-defined interactive submission, browsing, searching, and retrieving of advertisements
  - Uses several COTS tools: RogueWave class libraries, Sybase SQL Server (for Advertising Service database search and update), Sybase Replication Server (for cross-DAAC distribution and consistency in Advertising database information), Netscape Enterprise Server

# Subsystems and CSCIs: IOS (Cont.)



- **Advertising Service (ADSRV) CSCI**
  - Manages Earth Science related advertisements
  - Advertising data stored in a relational Database Management System (DBMS)
  - Consists of two components
    - Advertising Server: a background process that interacts with the DBMS for searching, inserting, and updating advertisements
    - Earth Science Online Directory (ESOD): a combination of HTML web pages and Common Gateway Interface (CGI) programs called from the HTML web pages to communicate with the Advertising Server and other ECS subsystems; permits users to submit new advertisements, operators to moderate (approve/reject) advertisements, and users to search for advertisements

# Subsystems and CSCIs: IOS (Cont.)

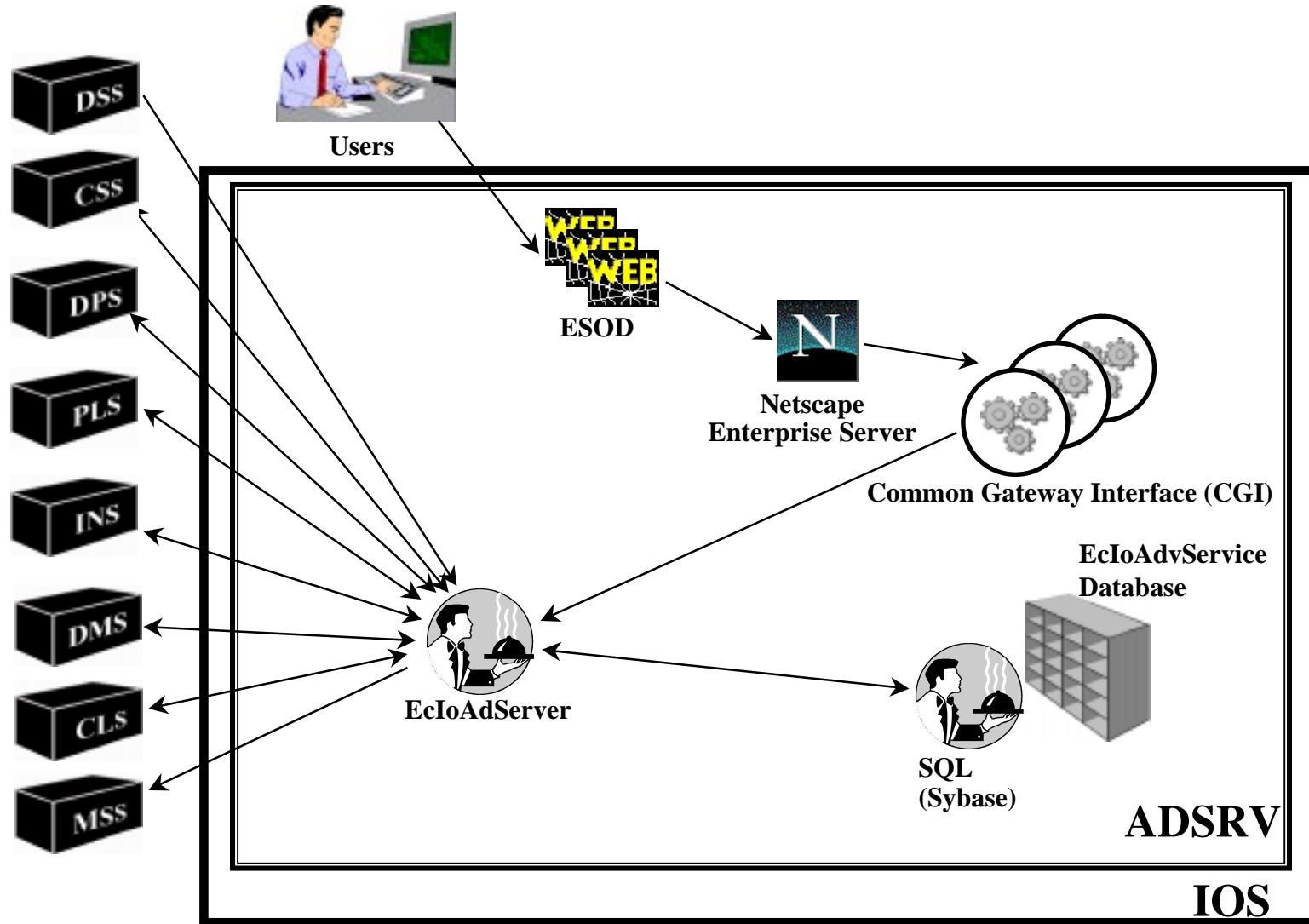


- **Advertising Server Component**
  - Three main processes
    - **Advertising Server** - provides clients with ability to search, insert, delete, and update advertisements
    - **Advertising Service SQL Server** - provides COTS relational database for the Advertising Service
    - **Advertising Service Replication Server** - COTS server at master site for consistent replication of ADSRV data across DAACs
- **Earth Science Online Directory (ESOD) Component**
  - Three main processes
    - **Advertising Service HTML Interfaces** - uses the HTML Framework to build the actual HTML files viewed by users
    - **Advertising Service HTTP Server** - receives and interprets the Hypertext Transfer Protocol (HTTP) from ESOD web pages
    - **ESOD HTML Communications** - Common Gateway Interface (CGI) programs to forward requests to the Advertising Server and receive results back

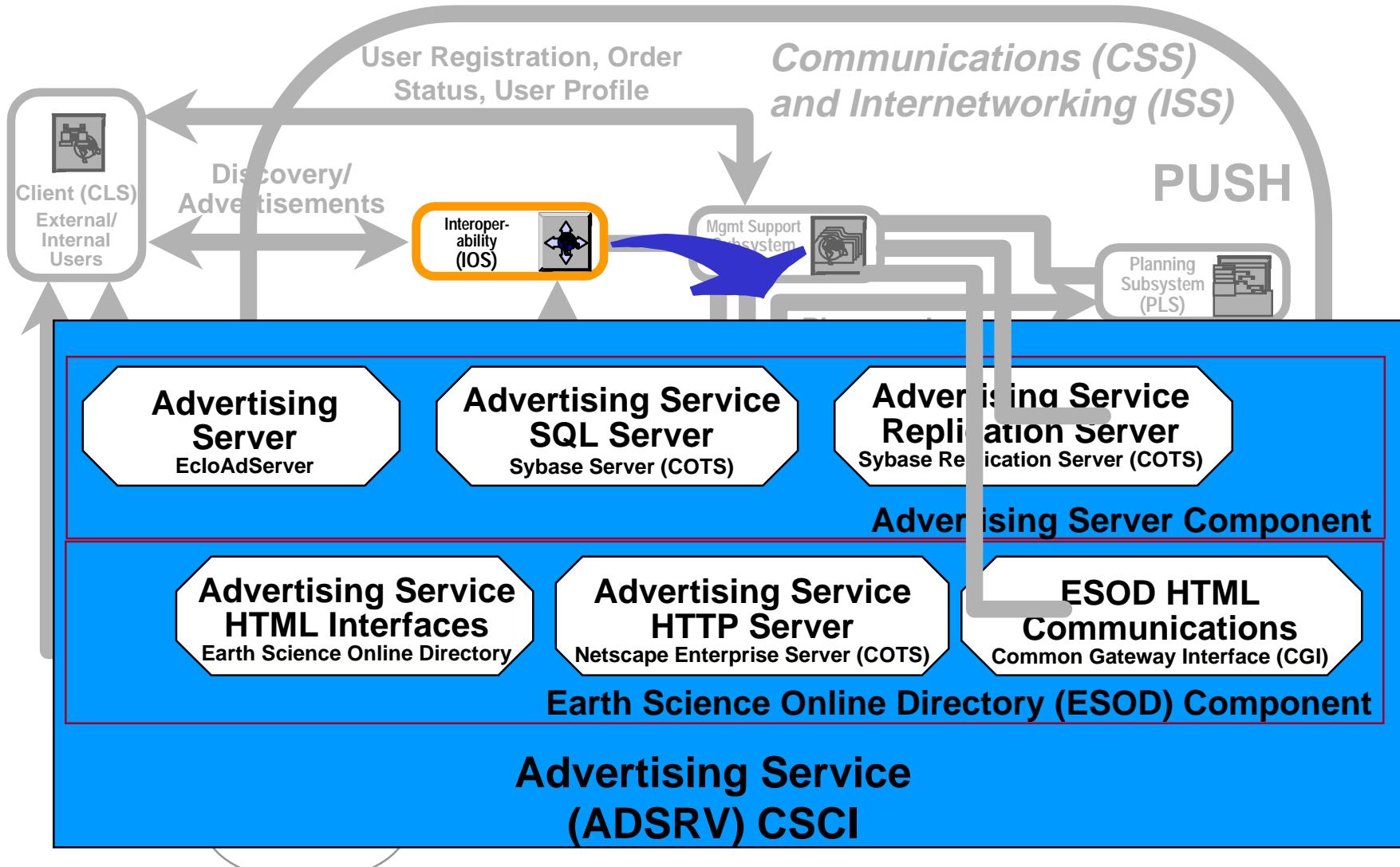


# Subsystems and CSCIs: IOS (Cont.)

## ADSRV Architecture and Interfaces



# Subsystems and CSCIs: IOS (Cont.)



# Subsystems and CSCIs: PLS



- **Planning Subsystem (PLS)**

- Allows operations staff to define data processing tasks to be performed at a site
- Generates efficient plans for scheduling defined data processing tasks
- Coordinates production with the Data Server and Data Processing subsystems to achieve a highly automated production system
- Interfaces with the Algorithm Integration and Test Tools CSCI within DPS for information on Product Generation Executives (PGEs)
- Permits entry of Production Requests and generates resulting Data Processing Requests (DPRs)
- Uses a set of Raytheon-provided COTS libraries as a basis for its scheduling components (Resource Planning Workbench and Production Planning Workbench)

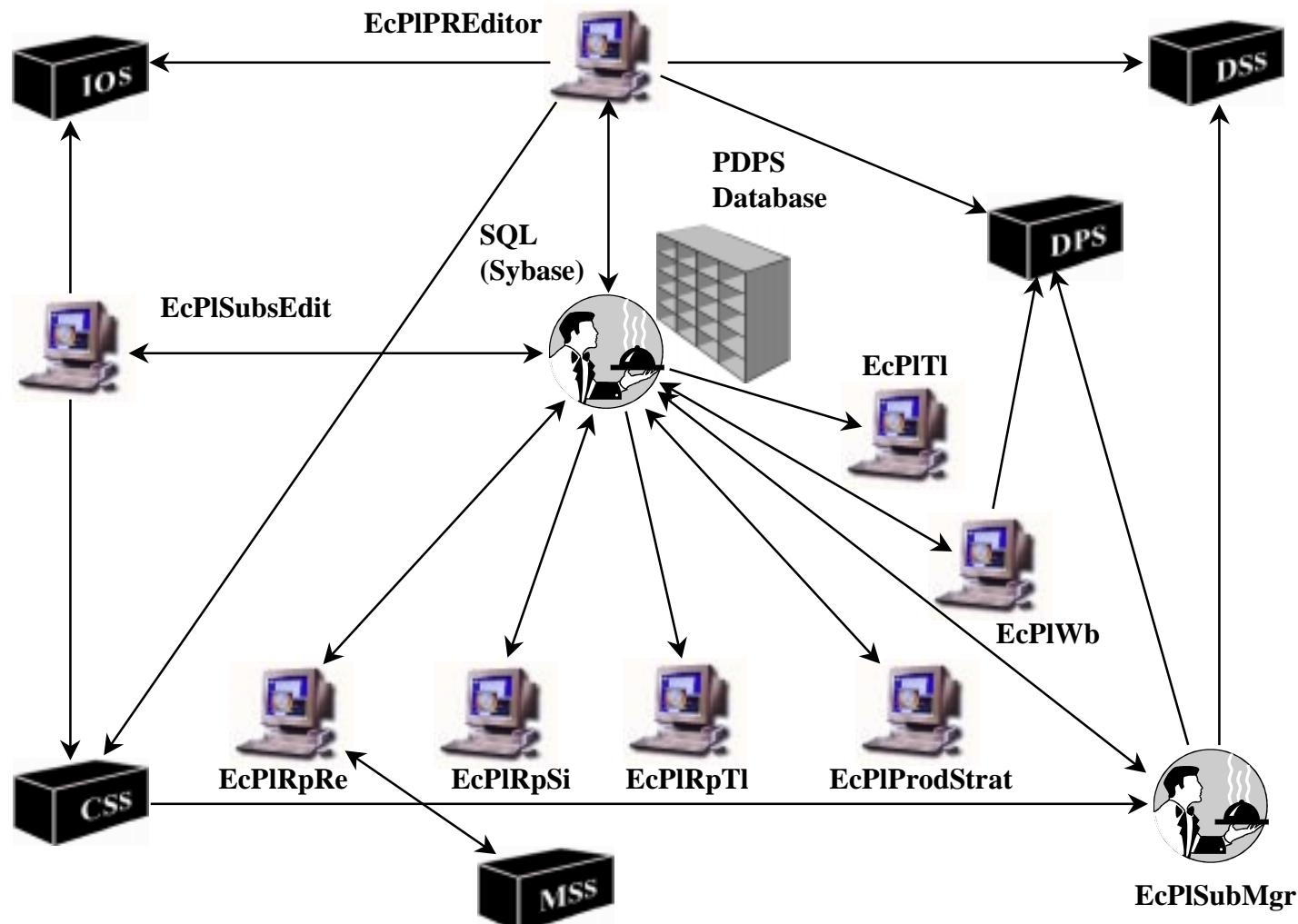
# Subsystems and CSCIs: PLS (Cont.)



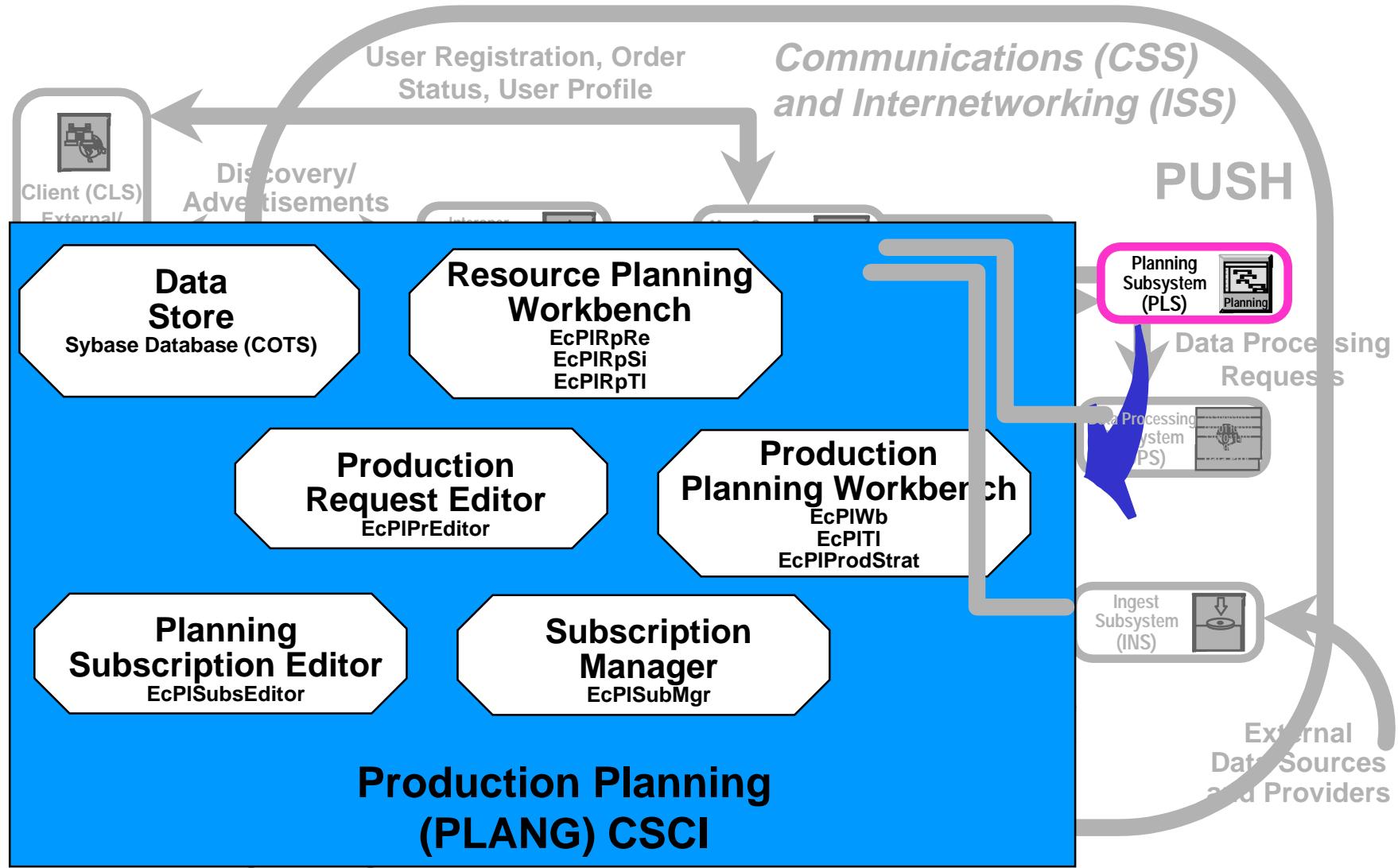
- **Production Planning (PLANG) CSCI**
  - Six major components
    - **Data Store** - handles insertion of data for planning and processing activities into the PDPS shared database
    - **Resource Planning Workbench** - GUIs for preparing a site resource schedule
    - **Production Request Editor** - GUI for submitting production requests that describe the data products to be produced; uses PGE descriptions to generate the DPRs necessary to meet the requests
    - **Production Planning Workbench** - GUIs for preparing a site production schedule and specifying production strategies
    - **Planning Subscription Editor** - command-line editor for manual submission of subscriptions to Data Server (backup for automatic submission by Production Request Editor)
    - **Subscription Manager** - server to manage receipt of subscription notifications from the Data Server

# Subsystems and CSCIs: PLS (Cont.)

## PLANG Architecture and Interfaces



# Subsystems and CSCIs: PLS (Cont.)



# Subsystems and CSCIs: DPS



- **Data Processing Subsystem (DPS)**
  - Manages data processing resources at a site
  - Manages, queues, and executes DPRs
  - Supports execution of science algorithms through the Science Data Processing (SDP) Toolkit
  - Supports preliminary processing of ancillary data sets
  - Provides an Algorithm Integration and Test (AIT) environment for the introduction of science software
  - Provides a Quality Assurance (QA) environment for testing the quality of data products
  - Uses COTS tools
    - AutoSys: a job scheduling software application to automate operations in a distributed UNIX environment
    - AutoXpert: provides mechanisms and GUIs to monitor and manage the job schedule being processed in AutoSys



# Subsystems and CSCIs: DPS (Cont.)



- Processing (PRONG) CSCI
  - Provides services required to manage and monitor the Science Data Processing environment, which executes Science Software items (PGEs) and produces data products
  - Eleven major components
    - Job Management - handles flow of information to the COTS products
    - Data Management - handles flow of science data to and from science processing resources
    - Execution Management - initiates execution of PGEs and performs final activities subsequent to execution of PGEs
    - PGE Management - controls and monitors execution of PGEs and the growth of the output products
    - Resource Management - supports management of science processing resources

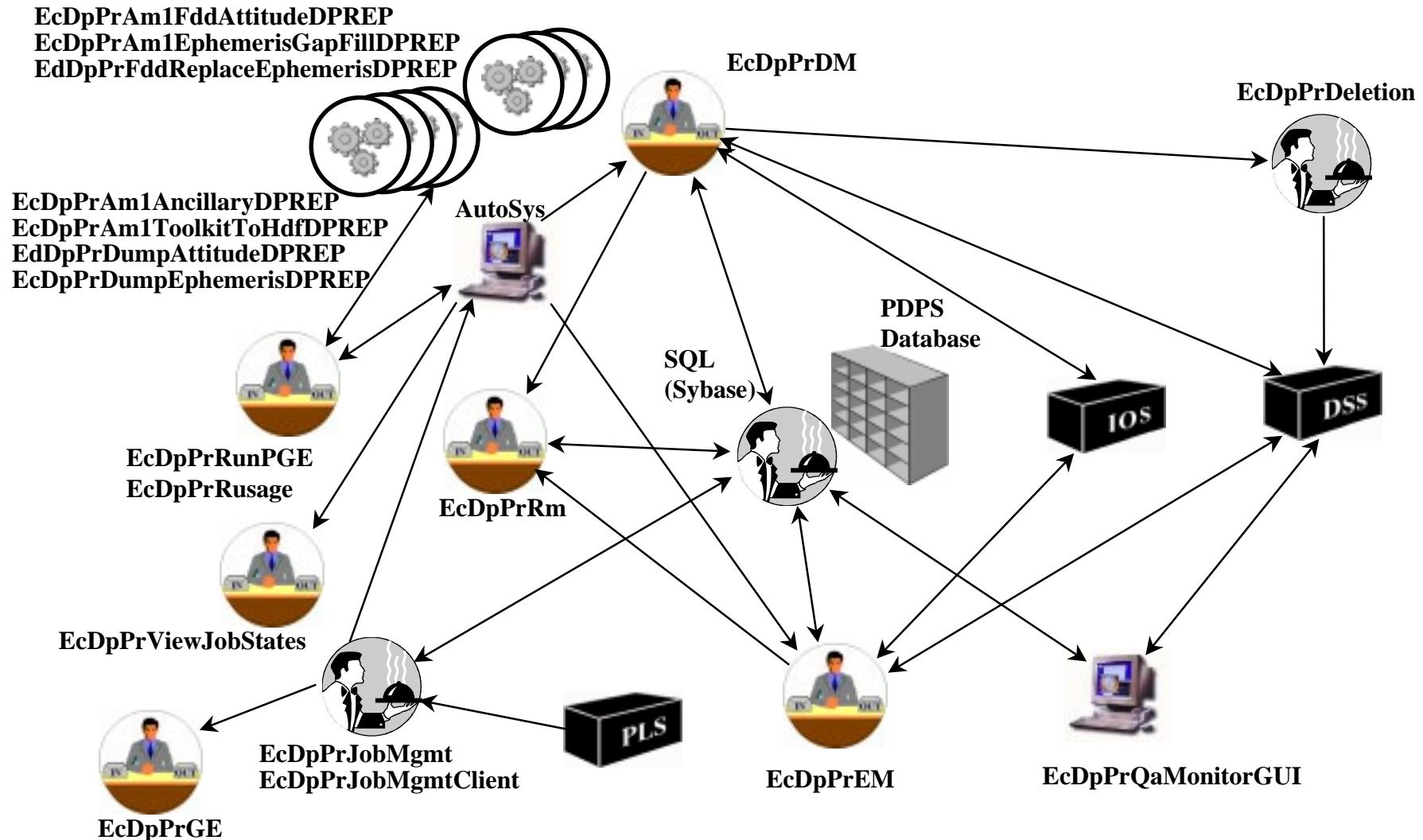
# Subsystems and CSCIs: DPS (Cont.)



- Processing (PRONG) CSCI (Cont.)
  - Eleven major components (Cont.)
    - **Deletion Server** - notifies Science Data Server to remove interim products that are no longer needed
    - **Quality Assurance Monitor** - supports visualizing science data products and updating QA metadata
    - **Data Preprocessing** - manages preprocessing of ancillary data used as inputs to a PGE
    - **AutoSys** - provides the job scheduling engine (COTS)
    - **Data Store** - handles insertion of data for planning and processing activities into the PDPS shared database
    - **Ground Event Process** - initiated by Job Management upon receipt of a ground event request; sets a computer resource to an off-line state, making it unavailable for PGEs during the request

# Subsystems and CSCIs: DPS (Cont.)

## PRONG Architecture and Interfaces



# Subsystems and CSCIs: DPS (Cont.)



- **Algorithm Integration and Test Tools (AITTL) CSCI**
  - Provides a set of tools used for testing and integration of new science software, new versions of science software, and user methods into the Science Data Processing operational environment
  - Combines custom-developed code with COTS software
  - Tools are accessed from a centralized application called the Science Software Integration and Test (SSIT) Manager

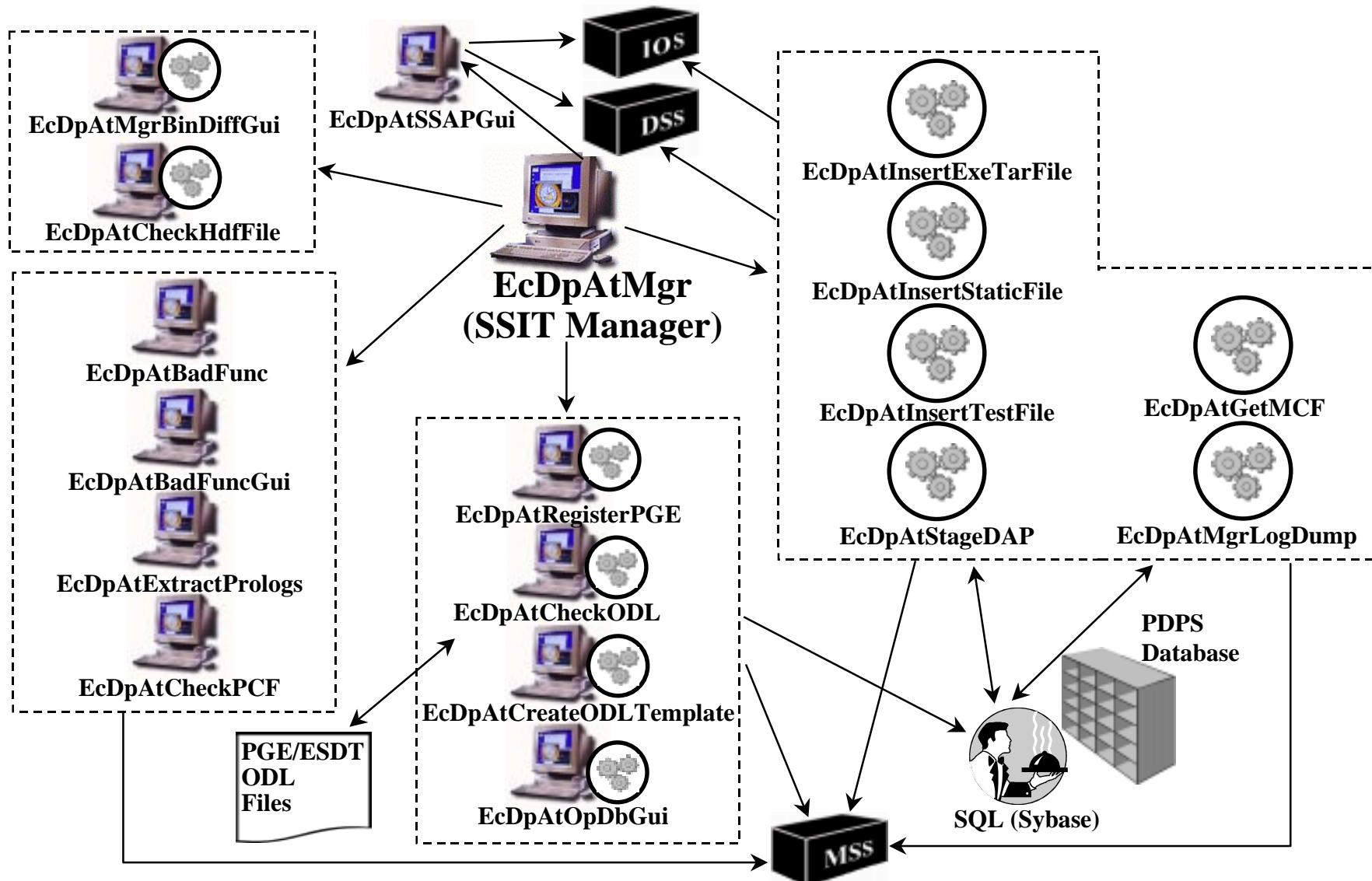
# Subsystems and CSCIs: DPS (Cont.)



- Algorithm Integration and Test Tools (AITTL) CSCI (Cont.)
  - Six major components
    - Science Software Archive Package (SSAP) GUI - allows for the creation, update, and deletion of SSAPs
    - SSIT Manager - GUI for SSIT activities; provides menus to launch other SSIT applications and a checklist to mark completion of SSIT functions
    - Define PGE - a group of applications to specify a PGE in the PDPS database
    - View/Compare Tools - a group of applications for viewing and comparing data files
    - Check Software Tools - a group of applications that check the source code for PGEs and their process control files (PCFs) for errors or prohibited functions
    - Insert/Acquire Tools - a group of applications that provide mechanisms to insert and acquire data items from Data Server

# Subsystems and CSCIs: DPS (Cont.)

## AITTL Architecture and Interfaces

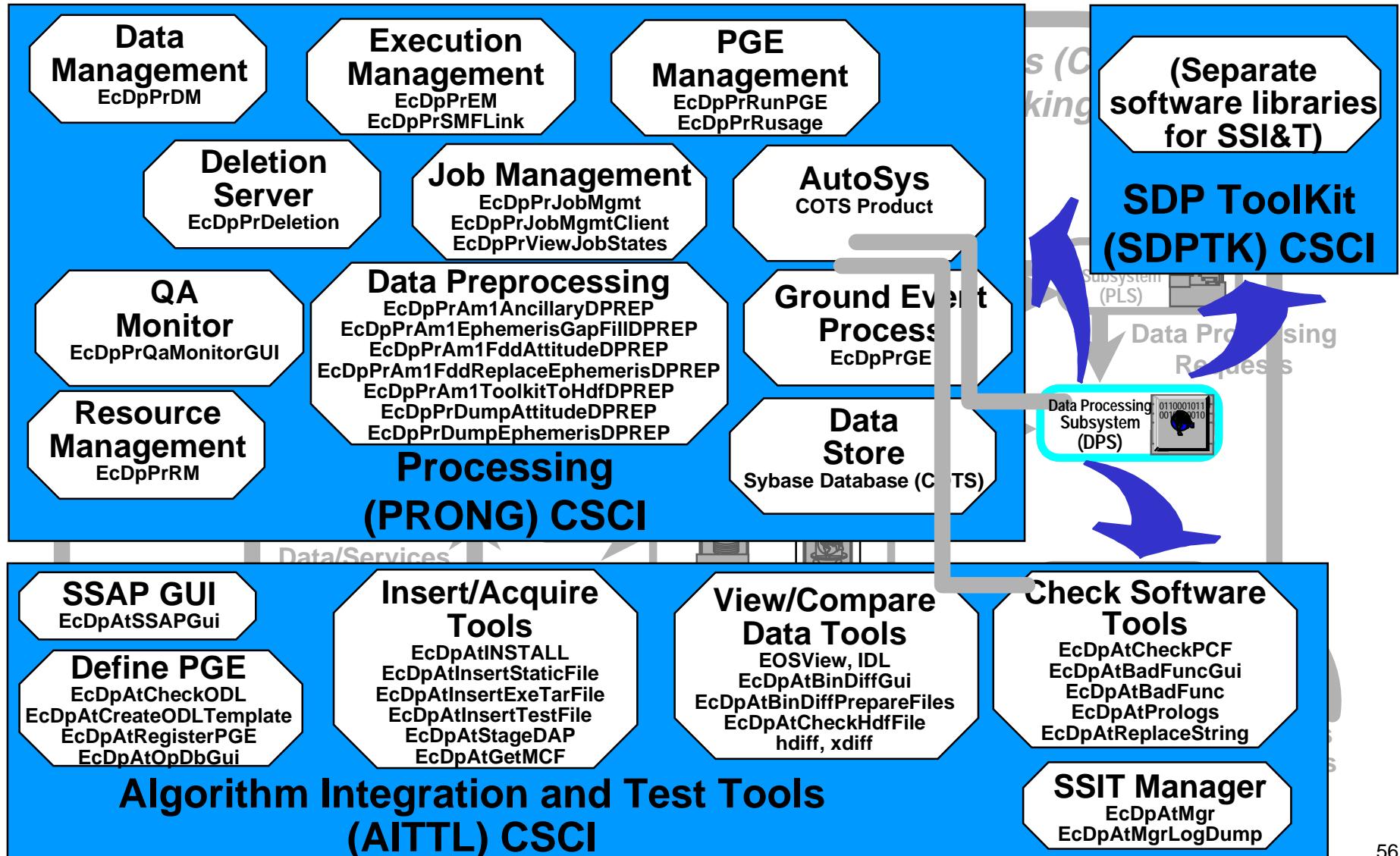


# Subsystems and CSCIs: DPS (Cont.)



- **SDP Toolkit (SDPTK) CSCI**
  - Provides a set of software libraries used to integrate Science Software into ECS
  - Allows Science Data Processing to support generation of data products in a heterogeneous computer hardware environment
  - Not described in detail in this course

# Subsystems and CSCIs: DPS (Cont.)



# Subsystems and CSCIs: MSS



- **System Management Support Subsystem (MSS)**
  - Provides the set of tools needed by Maintenance & Operations (M&O) staff to manage ECS operations
  - Addresses 5 areas
    - Fault Management
    - Configuration Management
    - Accountability Management
    - Performance Management
    - Security Management
  - Installed at Local System Management (LSM) position at each DAAC and at System Monitoring and Coordination Center (SMC)
  - Uses COTS applications extensively

# Subsystems and CSCIs: MSS (Cont.)



- **Management CSCI (MCI)**
  - Primarily COTS-based, with some custom software
  - Provides services for monitoring and coordinating ECS
  - **Network and Enterprise Management Framework component**
    - HP OpenView Network Node Manager (NNM)
    - Tivoli/Enterprise Console (T/EC)
  - **Security component**
    - Various shareware packages
    - Monitor and evaluate security and report status
  - **Accountability component**
    - Custom software
    - User Registration Tool
    - Order Tracking Tool

# Subsystems and CSCIs: MSS (Cont.)



- Management CSCI (MCI) (Cont.)
  - Physical Configuration Management component
    - COTS software: Accugraph Physical Network Manager
    - Physical location database for objects (devices) in the network
  - Trouble Ticketing component
    - Custom-configured COTS software: Remedy Action Request System
  - Network Backup/Restore component
    - COTS software: Legato Networker
  - ASTER E-mail Header Handler component
    - Custom scripts work with COTS e-mail to add a formatted header to all e-mail exchanges between the ASTER Ground Data System and ECS



# Subsystems and CSCIs: MSS (Cont.)



- **Management Agent CSCI (MACI)**
  - Manages and monitors ECS applications
  - **SubAgent component**
    - Custom code using COTS libraries (e.g., PEER tools)
    - Communicates management requests and responses from the Master Agent and the Deputy Agent to ECS applications (directly for custom applications and via the Proxy Agent for COTS applications)
    - Three processes: discovery, startup, shutdown
  - **Deputy Agent component**
    - Handles secure delivery of requests for setting management information
    - Developed using COTS-supplied API calls to HP OpenView
  - **Proxy Agent component**
    - Manages non-SNMP manageable COTS products
  - **Master Agent component**
    - SNMP agent (from vendor for each managed host); distributes the management of resources to one or more subagents using a client/server communications paradigm

# Subsystems and CSCIs: MSS (Cont.)



- **Management Logistics CSCI (MLCI)**
  - Implements Configuration Management services
  - **Baseline Manager component**
    - Customized COTS software: an XRP-II application
    - Helps DAACs, EOC, and SMC maintain records that document the hardware and software items that comprise baselined, operational system configurations
    - Two custom files
      - README.RelB (text file): provides instructions for installing and configuring the Baseline Manager and Inventory/Logistics/Maintenance Manager components
      - scr\_perm.doc (MS Word file): contains a table describing inquire, add, modify, and delete permissions assigned by default to screens for XRP-II user groups established for ECS

# Subsystems and CSCIs: MSS (Cont.)



- Management Logistics CSCI (MLCI) (Cont.)
  - **Inventory/Logistics/Maintenance (ILM) Manager component**
    - Customized COTS software: an XRP-II application
    - Tracks and maintains key data on ECS contract-purchased equipment, hardware, COTS software, COTS documentation (hardware and software), spares and consumable items, and Government Furnished Equipment (GFE)
    - Stores and maintains detailed maintenance data on hardware to the component level, including preventive and corrective maintenance
    - **No custom scripts; installation addressed in custom file**
      - README.RelB (text file): provides instructions for installing and configuring the Baseline Manager and Inventory/Logistics/Maintenance Manager components

# Subsystems and CSCIs: MSS (Cont.)



- Management Logistics CSCI (MLCI) (Cont.)
  - Software Change Manager component
    - Consists of COTS and custom software
      - ClearCase (with some customization)
      - ClearCase DDTs Integration
      - Supporting UNIX scripts
    - Helps DAACs, EOC, and SMC organize and partition software, control software changes and versions, and assemble sets of software for release
    - Integration with DDTs enables verification and recording of Configuration Change Request numbers associated with file versions being checked out of and into the ClearCase library

# Subsystems and CSCIs: MSS (Cont.)



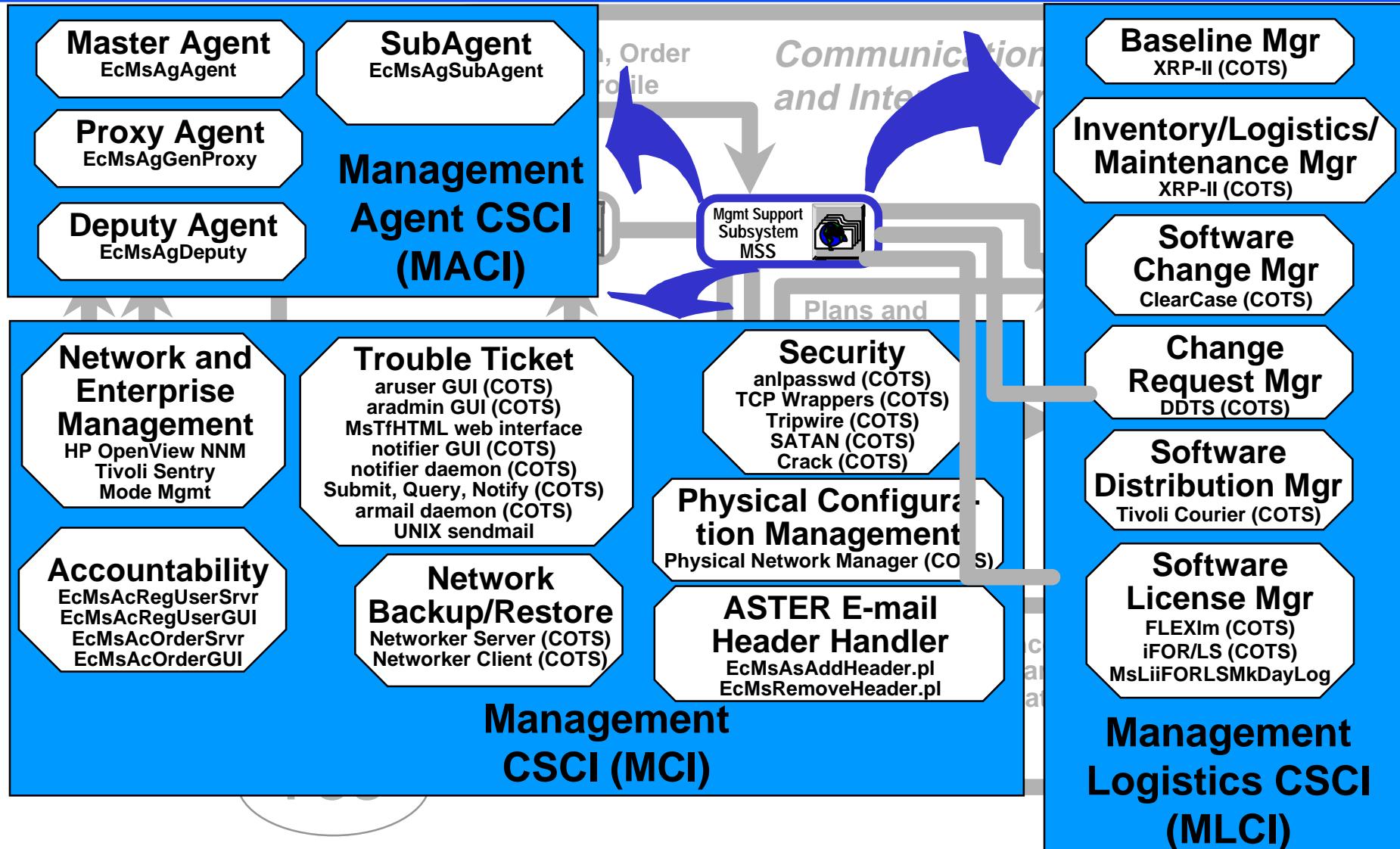
- Management Logistics CSCI (MLCI) (Cont.)
  - Change Request Manager component
    - Customized COTS application: Distributed Defect Tracking System (DDTS)
      - Also interfaces with ClearCase
    - Enables DAACs, EOC, and SMC to enter, maintain, and track Configuration Change Requests (CCRs)
    - Provides capability to compose and maintain local CCRs and to compose and submit CCRs to the SMC for system-wide consideration
    - Communication between site Change Request Managers can be established through a DDTS utility program and maintained by each site's DDTS administrator

# Subsystems and CSCIs: MSS (Cont.)



- Management Logistics CSCI (MLCI) (Cont.)
  - Software Distribution Manager component
    - COTS application: Tivoli/Courier
    - Enables SMC and DAACs to distribute ECS software, database, software documentation, and commercial software files across a multi-platform ECS network
  - Software License Manager component
    - COTS and custom software
      - FLEXIm (license manager) and iFOR/LS (license server) COTS packages
      - Script that updates log files with iFOR/LS events when invoked by MCI (Tivoli product)
    - Manages network licensing activities associated with using COTS products; maintains information about license provisions, meters use of installed licenses, and reports on licensing events and statistics

# Subsystems and CSCIs: MSS (Cont.)



# Subsystems and CSCIs: CSS (Cont.)



## *CSS/Distributed Communications Software*

- **Communications Subsystem (CSS)**
  - Provides for interconnection of users and service providers and transfer of information within ECS and between ECS and other EOSDIS components
  - Supports and interacts with the System Management Support Subsystem (MSS), Flight Operations Segment (FOS), and all other subsystems
  - Uses several COTS tools: RogueWave class libraries, Builder Xcessory (GUI Builder tool), Sybase SQL Server (for Subscription Server insert, search, and update), DCE (for security services), UNIX Network Services

# Subsystems and CSCIs: CSS (Cont.)



- **Distributed Computing Configuration Item (DCCI)**
  - **Subscription Server (SBSRV) component**
    - Detects previously defined events
    - Performs specified actions for clients that have previously subscribed to those events (e.g., science granule insertion, metadata update, new advertisement)
  - **ASTER DAR Communications Gateway component**
    - Provides interoperability between DAR Client GUI tool and the DAR API which interfaces to the ASTER servers
  - **ASTER EMailParser Gateway component**
    - Support for automated delivery of ASTER Expedited Data Sets (EDS) from ECS to ASTER Ground Data System (GDS)
  - **Landsat-7 Gateway component**
    - User access to data collected by Enhanced Thematic Mapper Plus (ETM+) instrument on Landsat-7 satellite

# Subsystems and CSCIs: CSS (Cont.)



- **Distributed Computing Configuration Item (DCCI) (Cont.)**
  - **DCE Service Group** component
    - COTS software set (Name, Security, Time Services)
  - **FTP (File Transfer Protocol)** component (standard application for file transfers)
  - **FTP Notification** component (for notification of successful FTP pulls from a pull area)
  - **BDS (Bulk Data Service)** component (fast file transfer over high-speed networks such as HIPPI)
  - **NFS (Network File System)** component (for file systems sharing among computers)
  - **Filecopy** component (a simple utility to copy large files from a specified source to a specified destination, with compression options)

# Subsystems and CSCIs: CSS (Cont.)



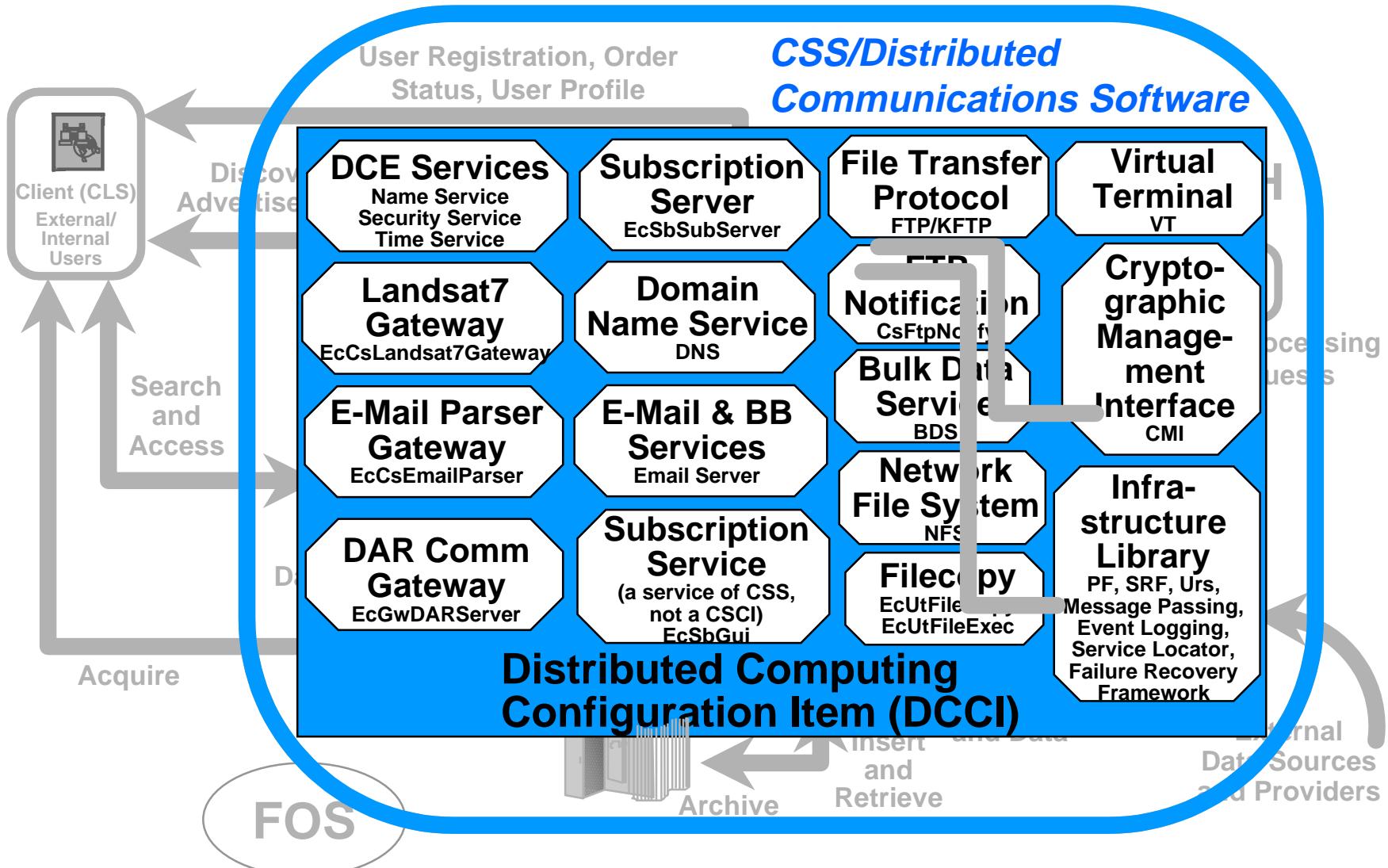
- **Distributed Computing Configuration Item (DCCI) (Cont.)**
  - **Mail Support Group component**
    - Provides electronic mail, with an interactive interface and an object-oriented application program interface
    - Bulletin Board Service, for messages directed to all readers of a named group
  - **Virtual Terminal component**
    - Provides operators the capability for remote logon to ECS machines
  - **Cryptographic Management Interface (CMI) component**
    - Allows operators to obtain randomized passwords for access to non-DCE services (e.g., Sybase)

# Subsystems and CSCIs: CSS (Cont.)

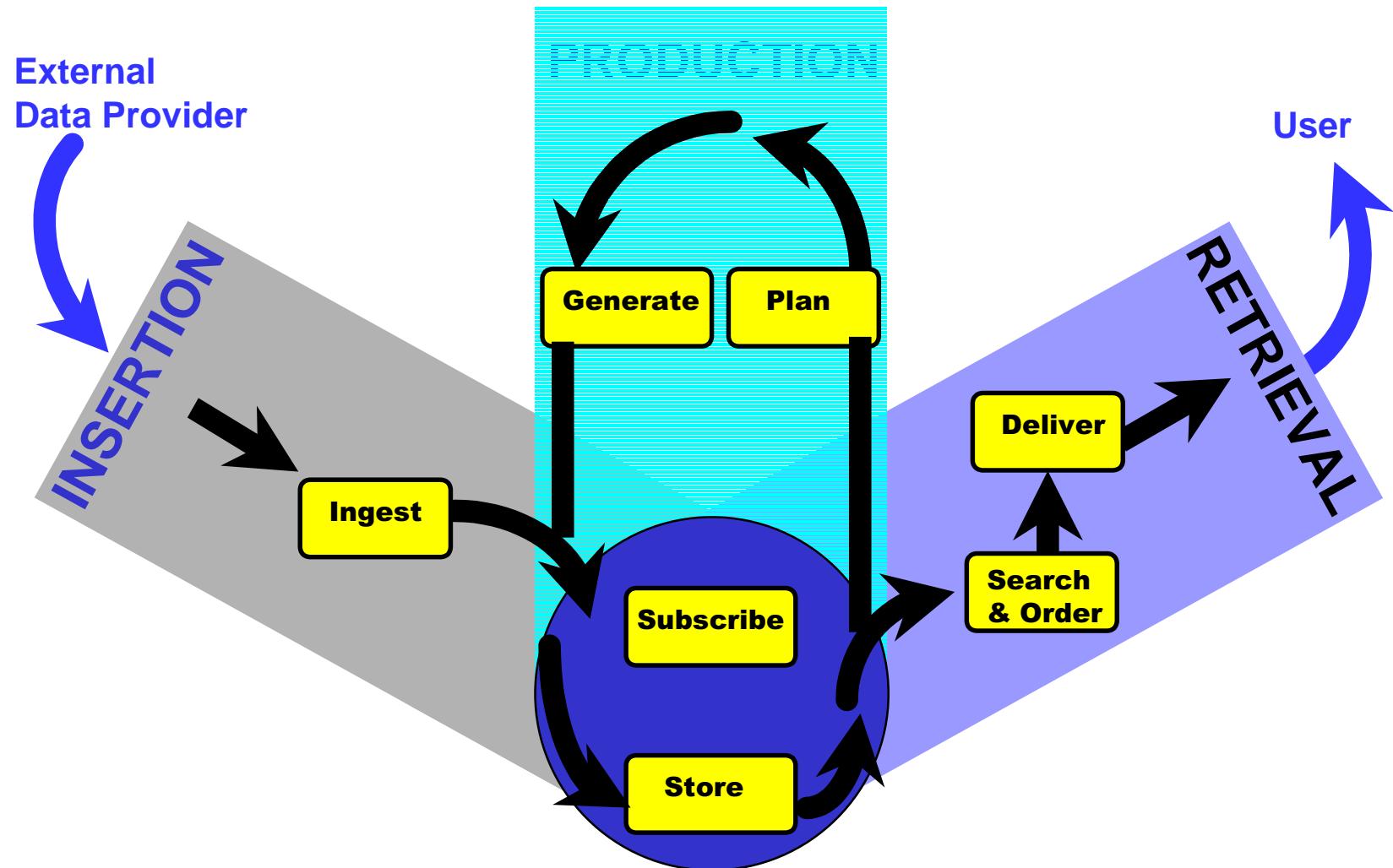


- **Distributed Computing Configuration Item (DCCI) (Cont.)**
  - **Domain Name Service (DNS) component**
    - Provides information about host names and addresses on a network by querying and answering queries
    - Performs naming between hosts within the local administrative domain and across domain boundaries
  - **Infrastructure Library component**
    - Provides a set of services to facilitate the implementation of client-server applications; includes Process Framework (PF), Service Request Framework (SRF), Message Passing, Universal References (URs), Event Logging, Service Locator, and Failure Recovery Framework

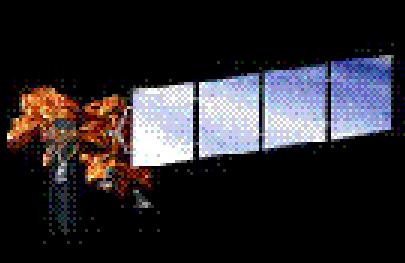
# Subsystems and CSCIs: CSS (Cont.)



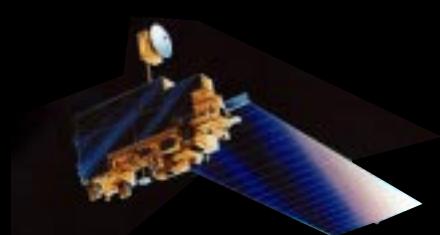
# ECS Operational Functioning



# ECS Version 2.0 Focus



Landsat-7



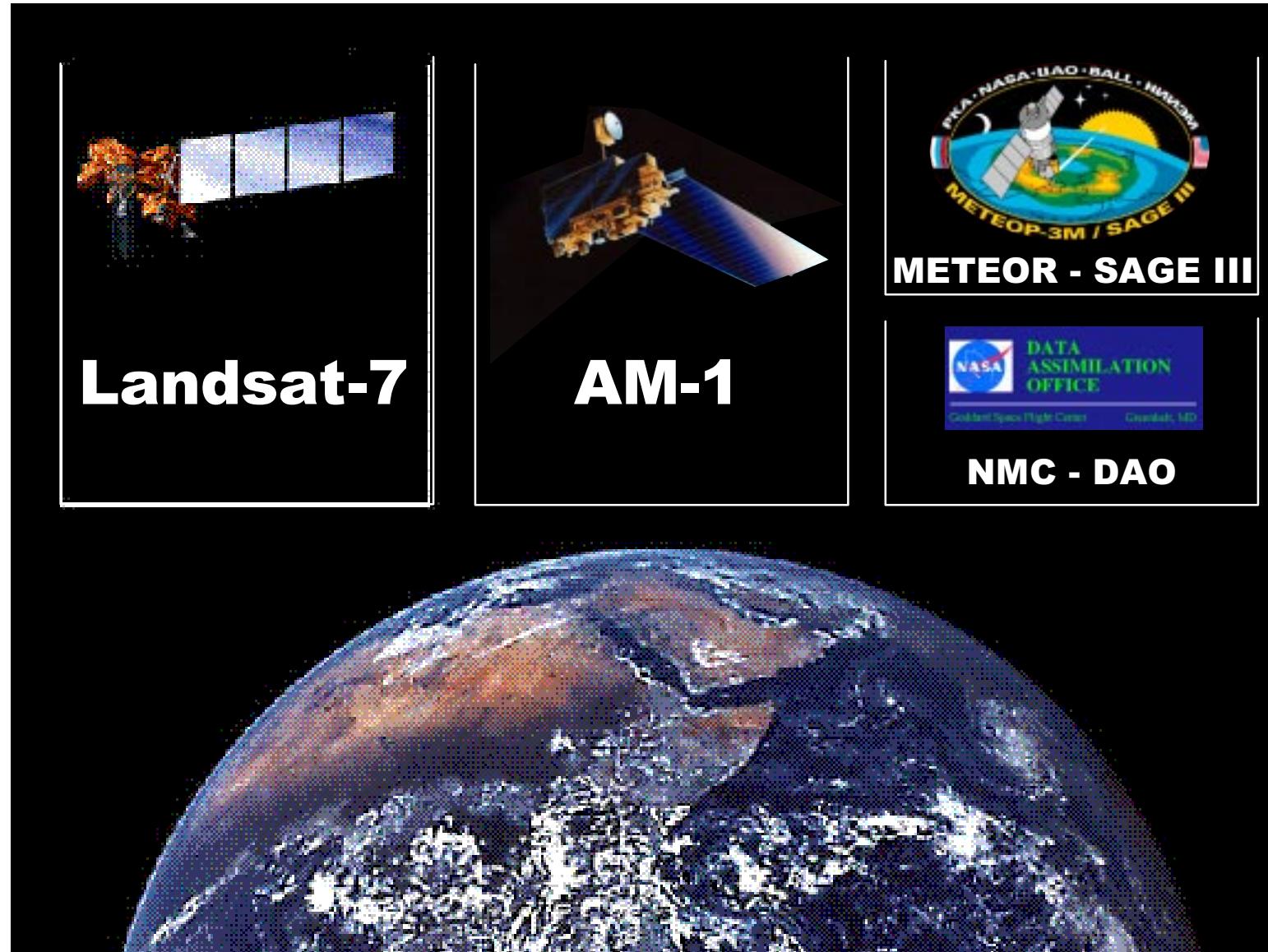
AM-1



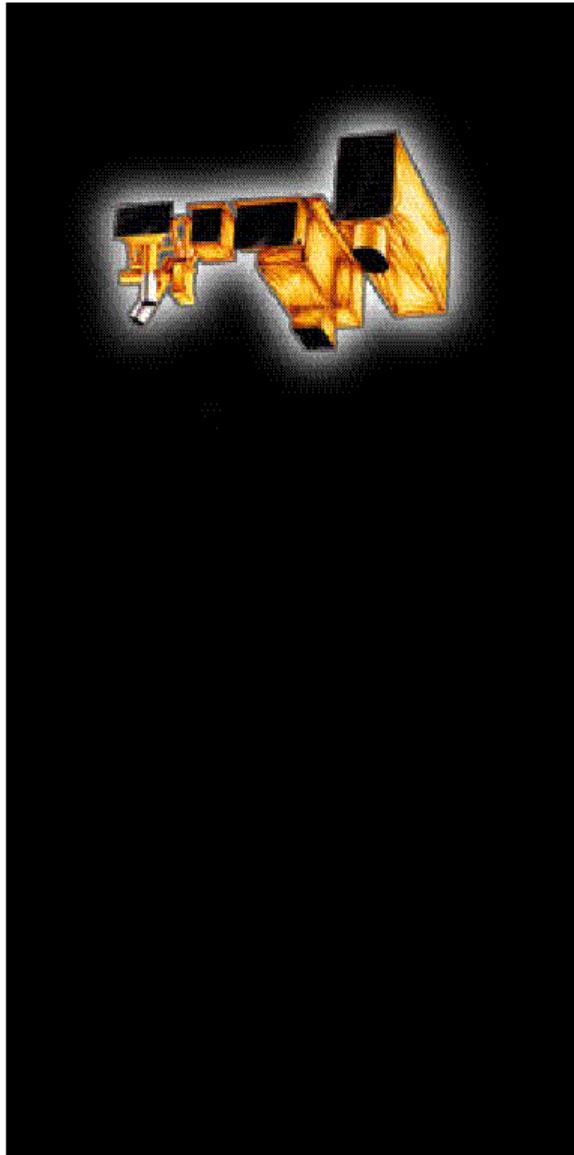
METEOR - SAGE III



NMC - DAO



# ASTER Scenario



## ASTER

- 1 DAR Support**
- 2 Backward Chaining**
- 3 Expedited Data**

### ASTER Goals

- *DARTool Usage*
- *Backward Chaining Workaround*
- *SCF QA Metadata Update Workaround*
- *Simplified ASTER Expedited Data Support*
- *Data Tape Ingest*

### ASTER Preconditions

*ASTER ESDTs Inserted into ECS*

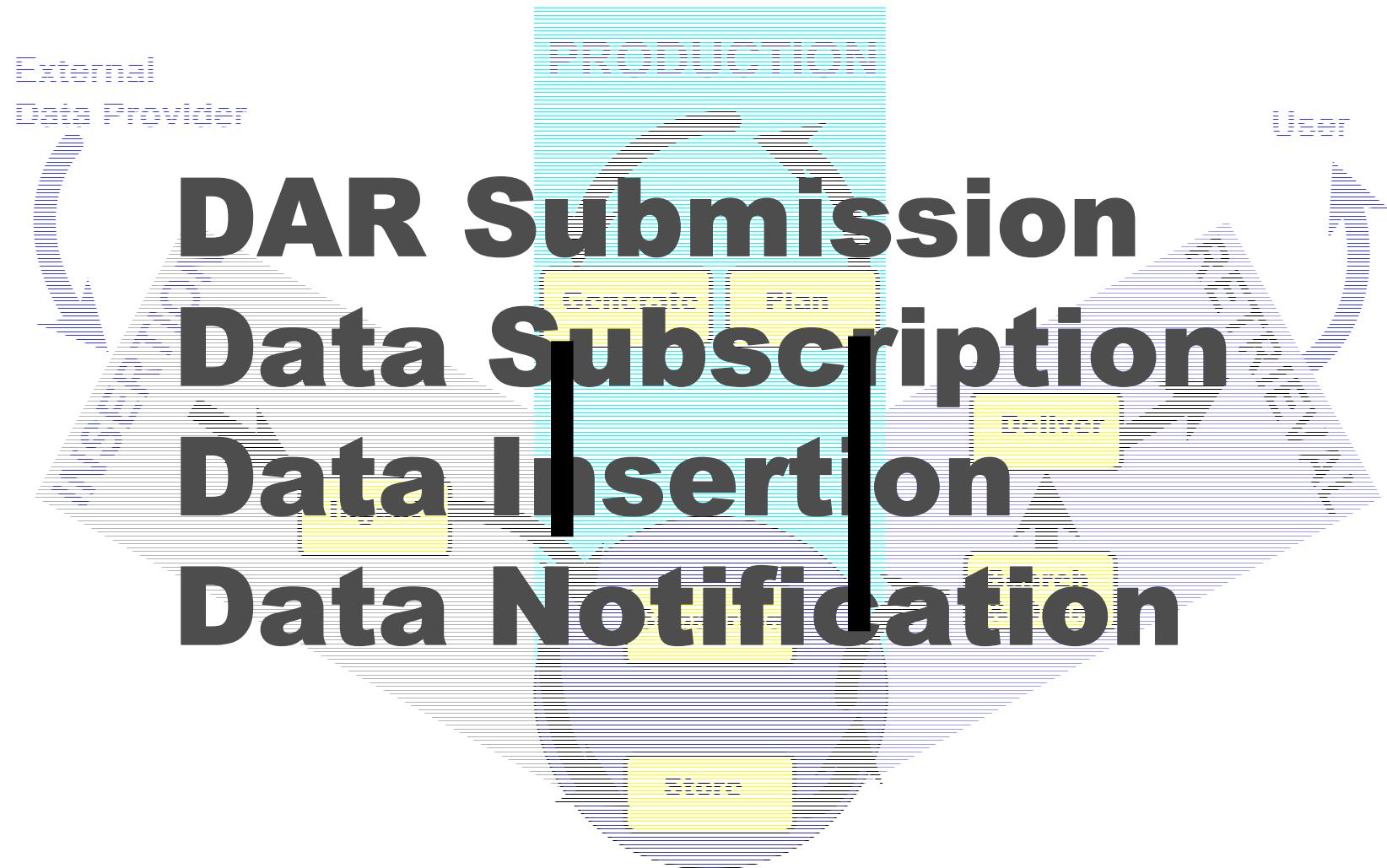
*- AST\_ANC, AST\_EXP, AST\_L1A, AST\_L1BT,  
AST\_09T, AST\_04, AST\_05, GDAS0ZFH*

*ASTER PGEs passed SSI&T and installed*

*- ACT, ETS, BTS*

*Ancillary data inserted into Data Server*

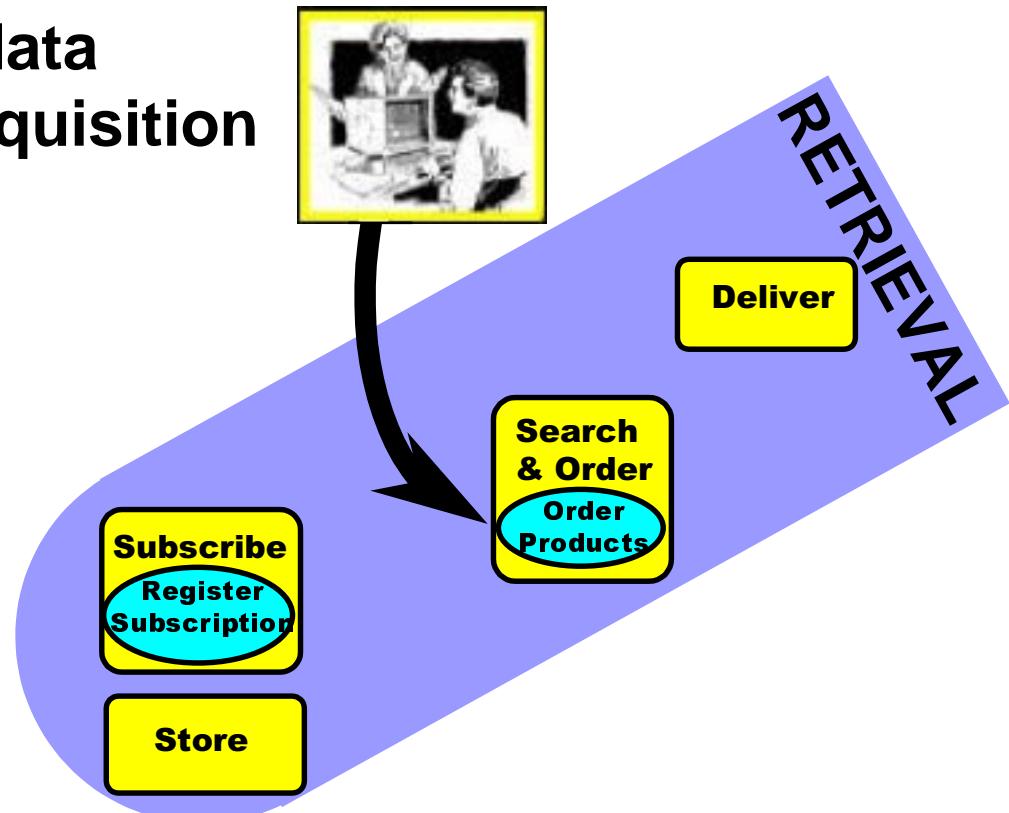
# ASTER Scenario: DAR Support



# DAR Support



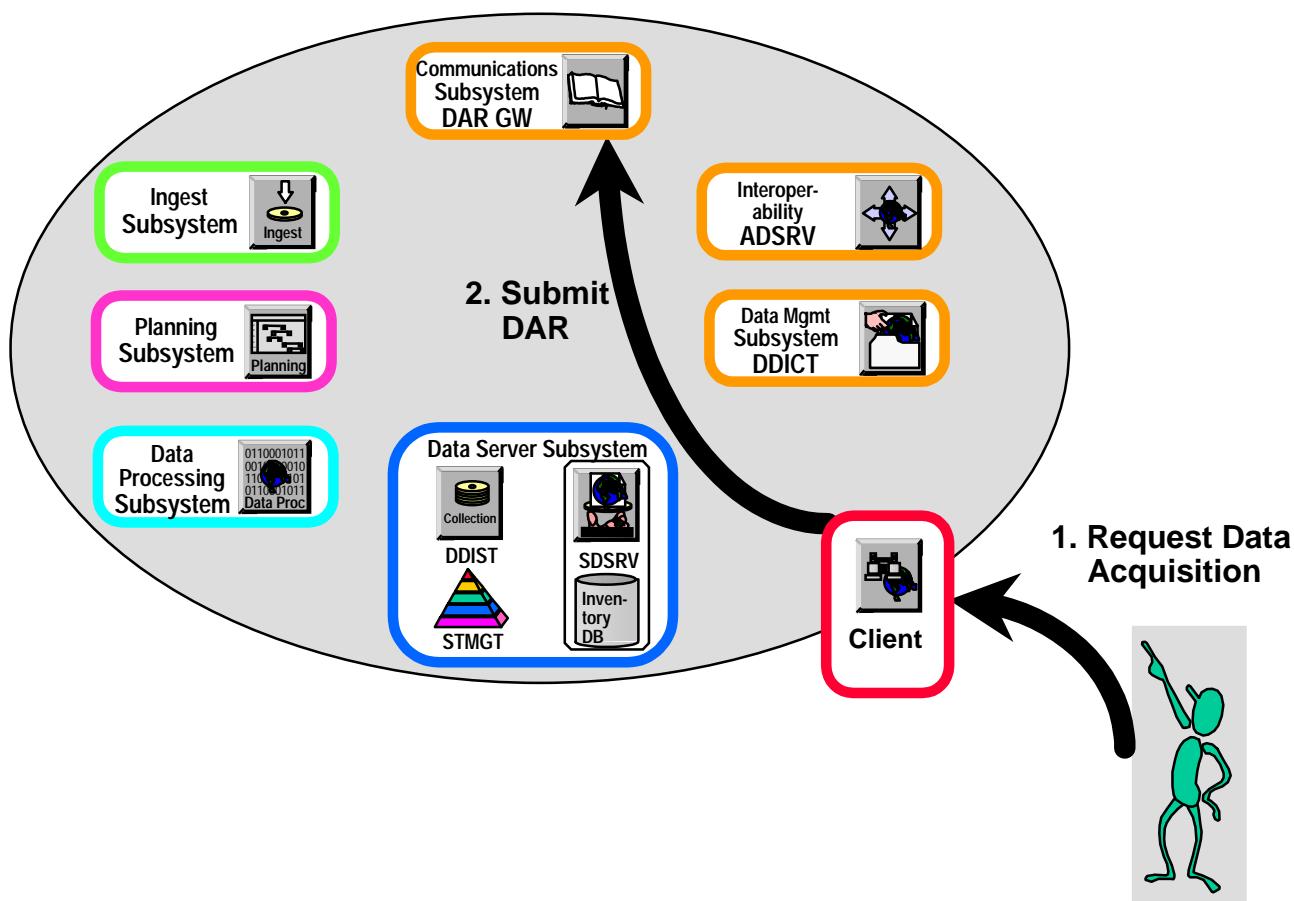
ASTER Scientist decides  
to request ASTER data  
requiring a Data Acquisition  
Request



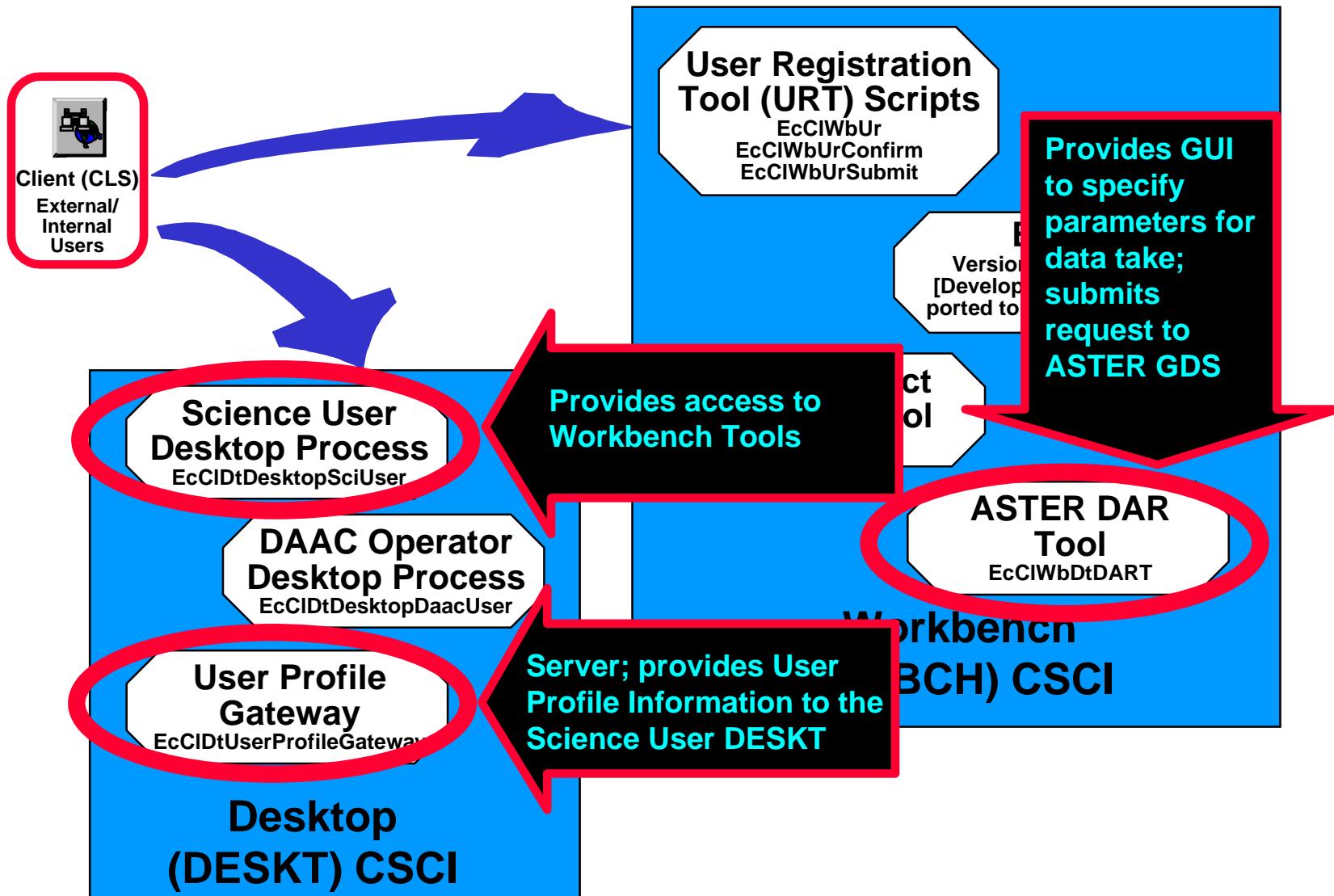
# ASTER: Client Request Process



ASTER Scientist determines an area of interest. The scientist decides to request an ASTER data take over that area, using the DARTool.



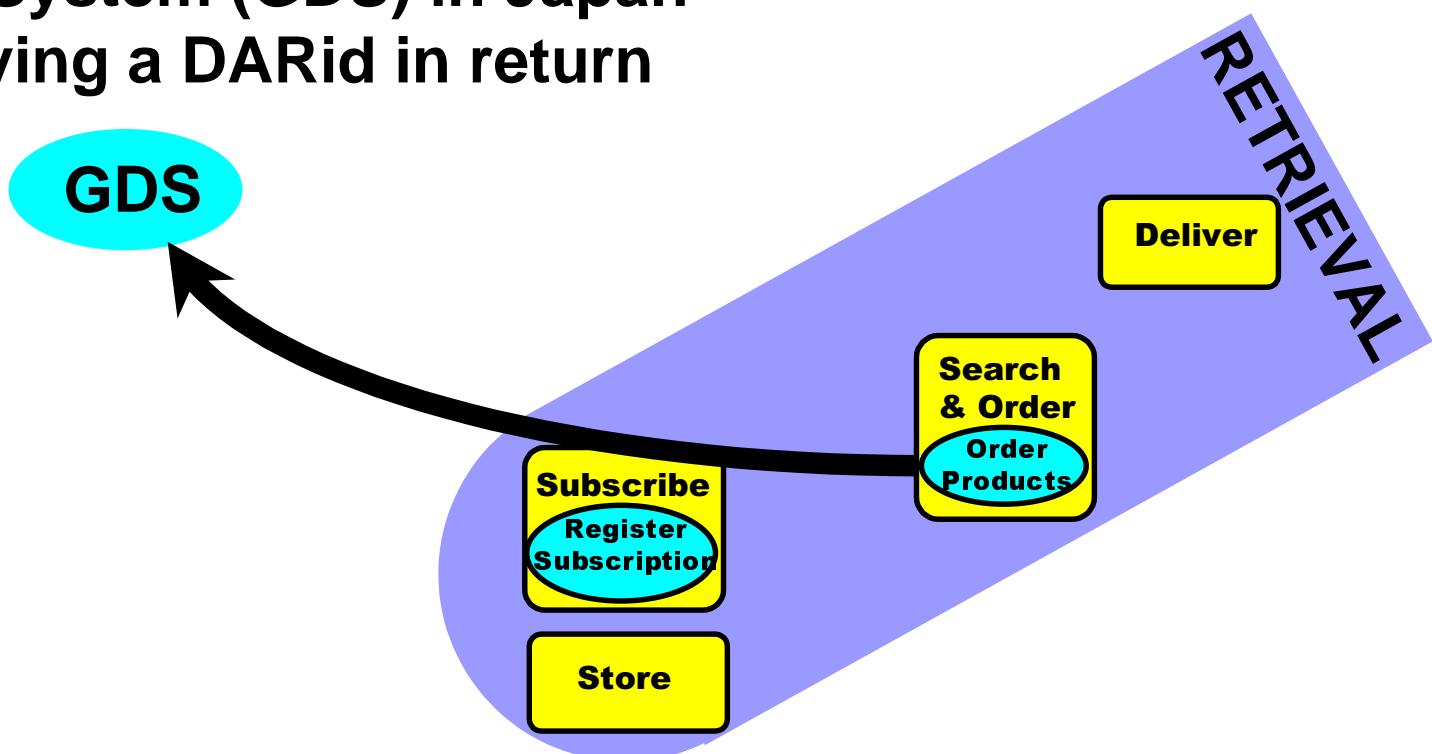
# ASTER: CSCI/Component Role in Client Request



# DAR Support (Cont.)



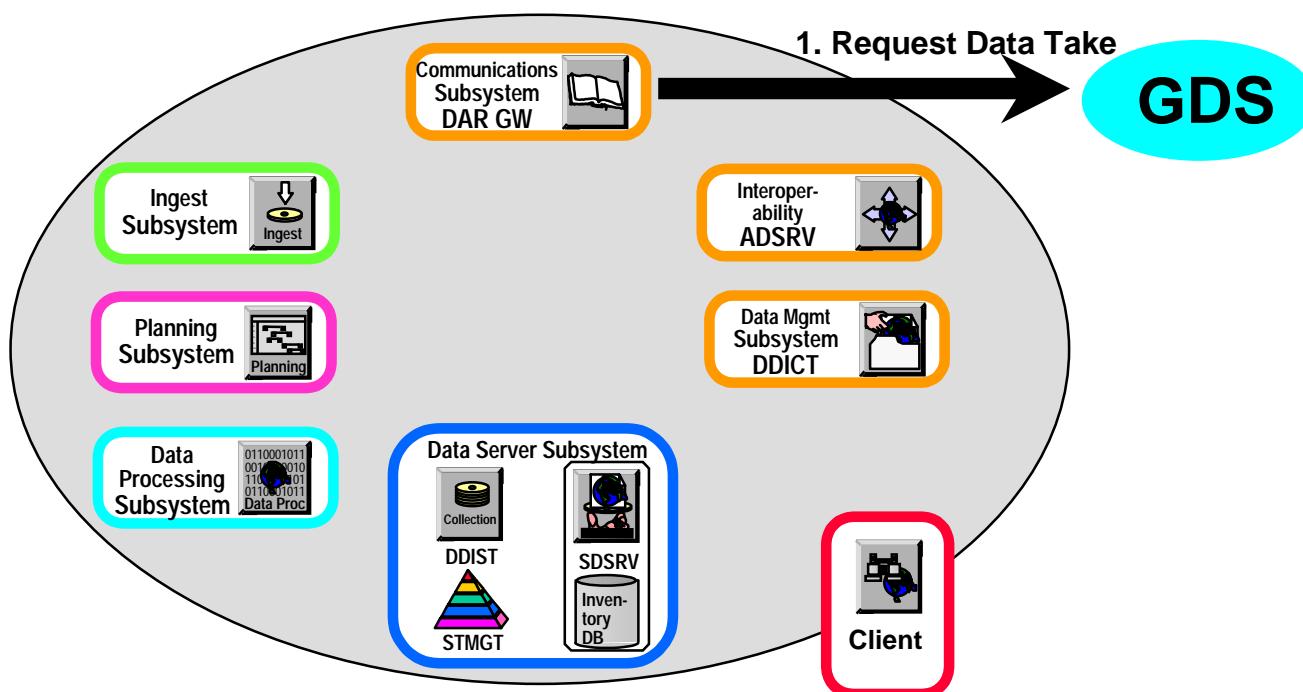
ECS submits DAR to ASTER Ground Data System (GDS) in Japan receiving a DARid in return



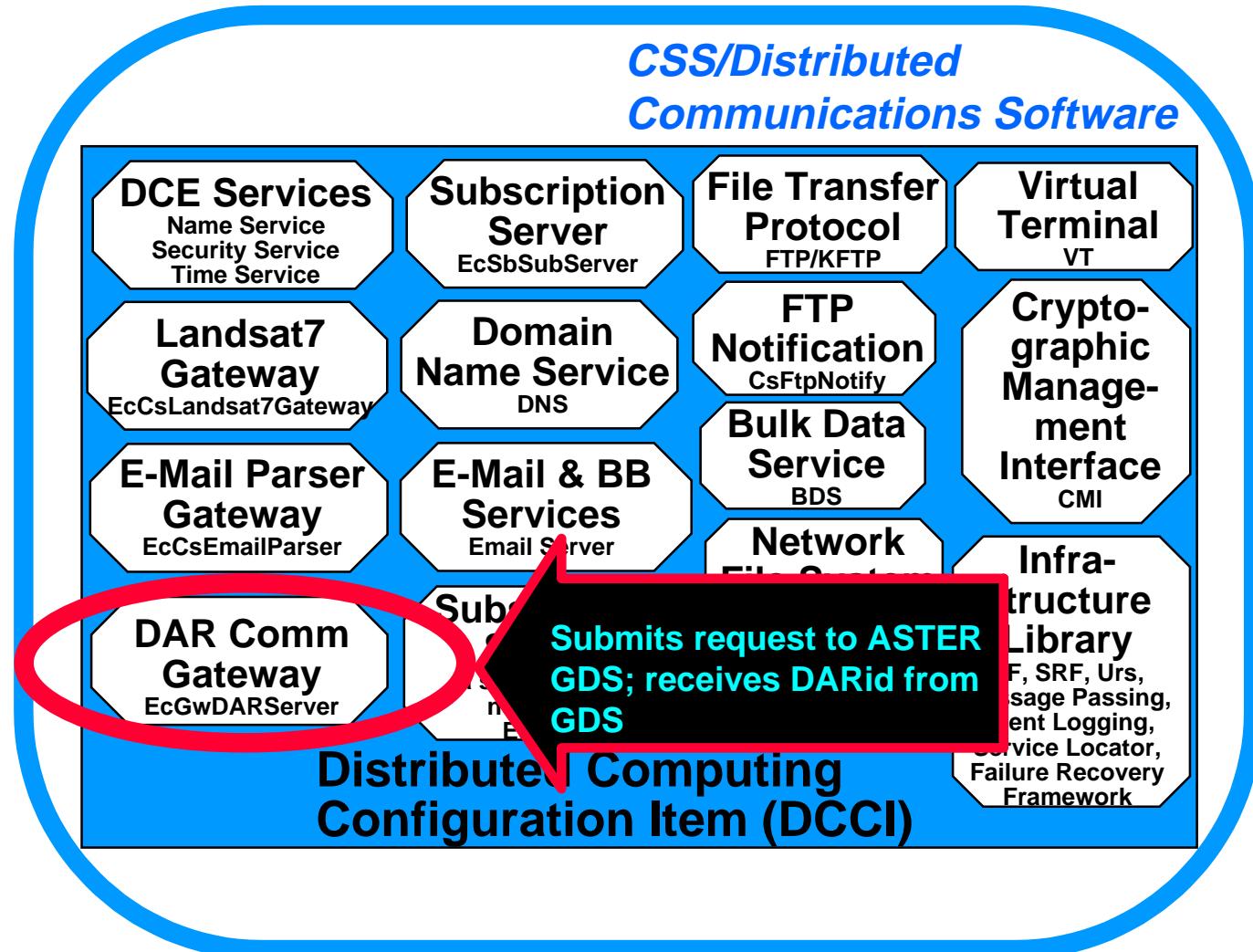
# ASTER: Request Data Take Process



ECS-GDS Gateway submits a request for a data take over the area of interest. GDS responds with a DARid.



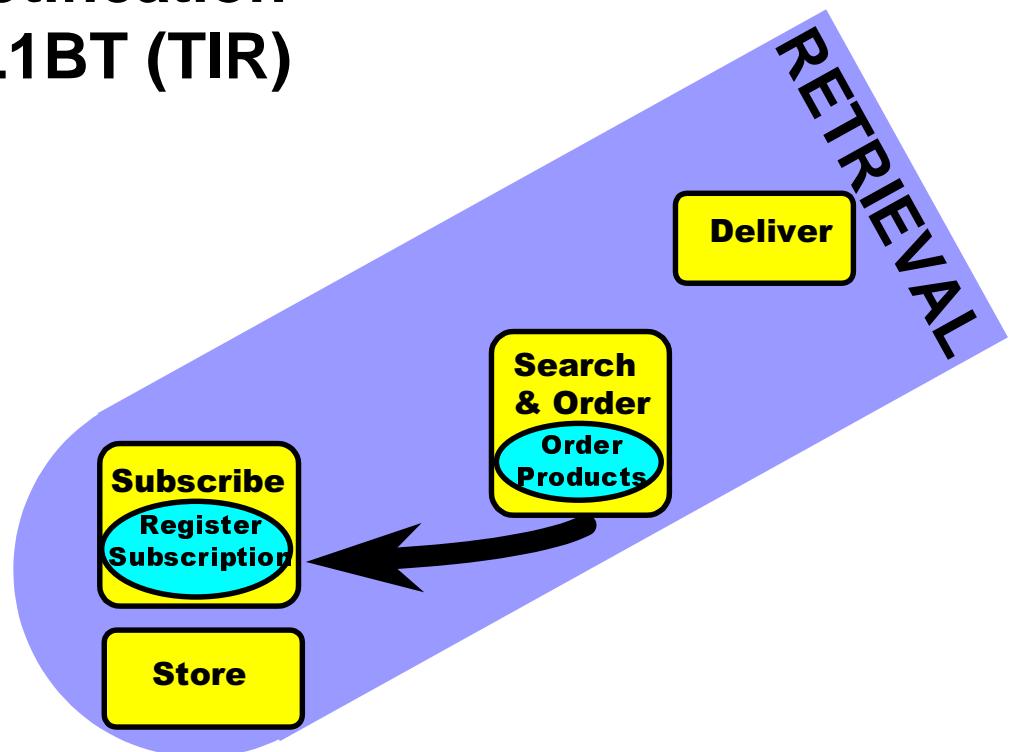
# ASTER: CSCI/Component Role in Data Take Request



# DAR Support (Cont.)



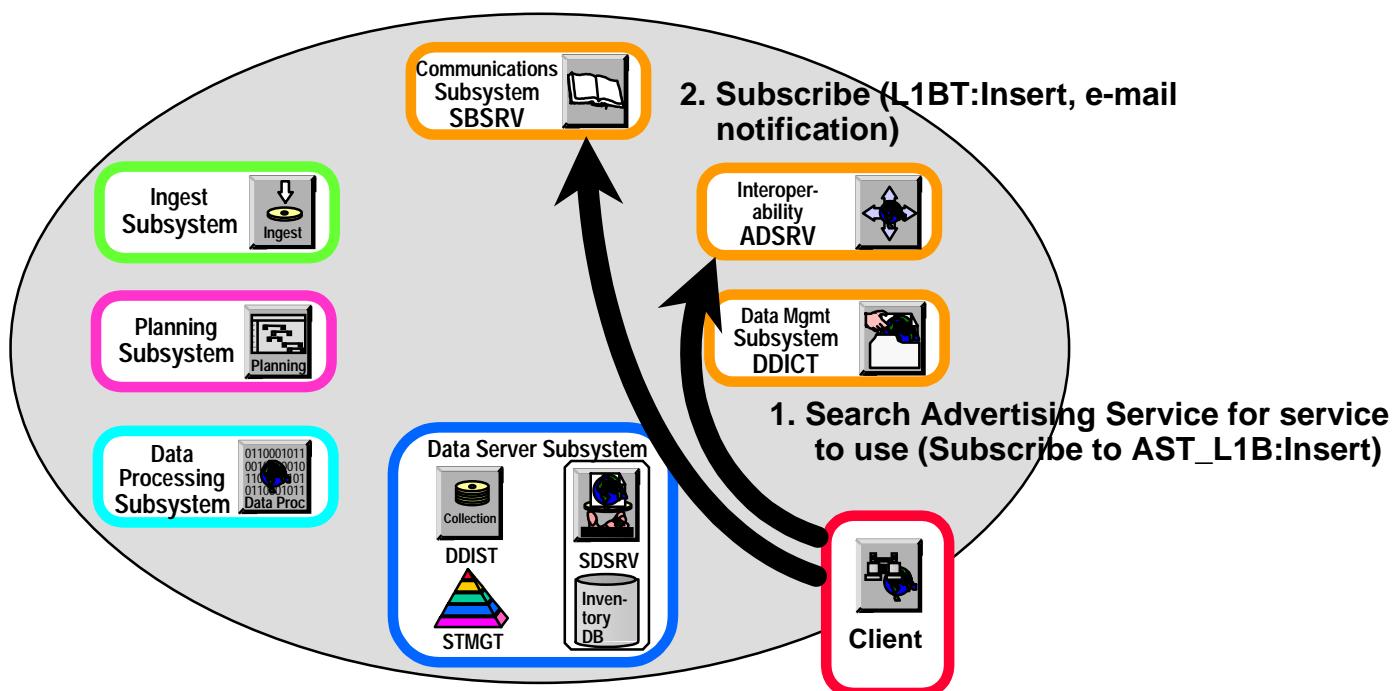
**Subscription is submitted on behalf of user for notification on receipt of AST\_L1BT (TIR) data**



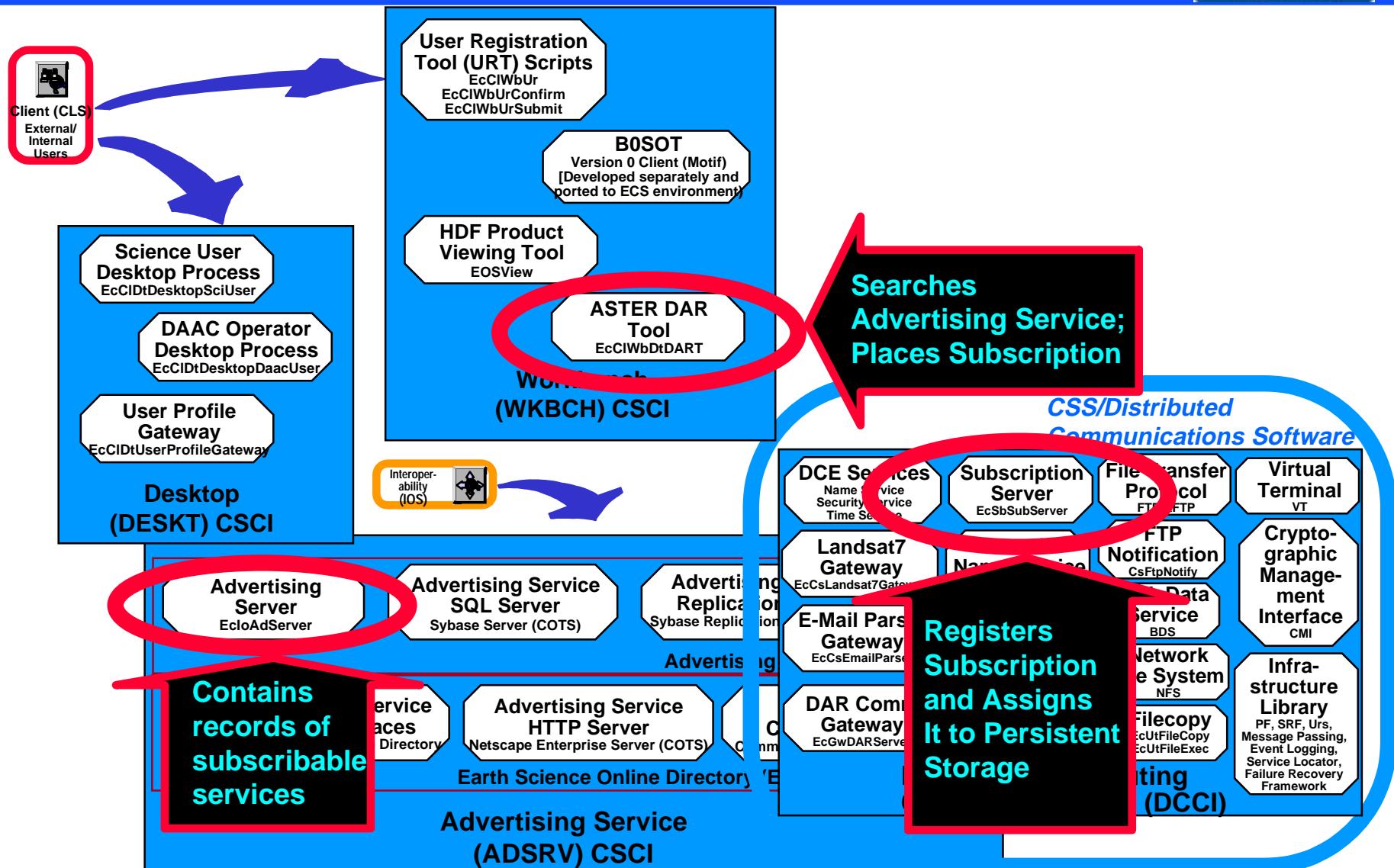
# ASTER: Submit Subscription Process



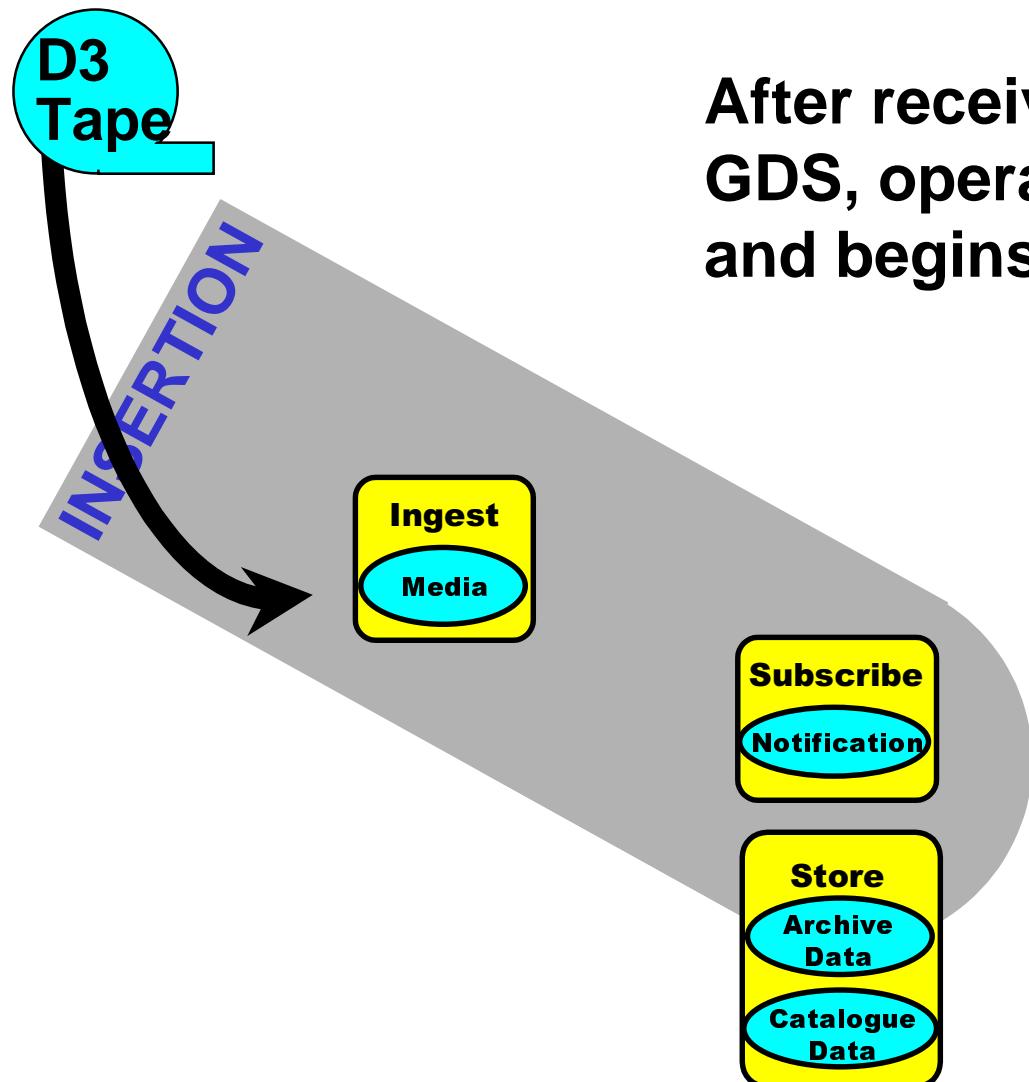
DARTool submits subscription for notification on the occurrence of AST\_L1BT:Insert event, qualified with the DARid.



# ASTER: CSCl/Component Role in Subscription Submission



# DAR Support (Cont.)

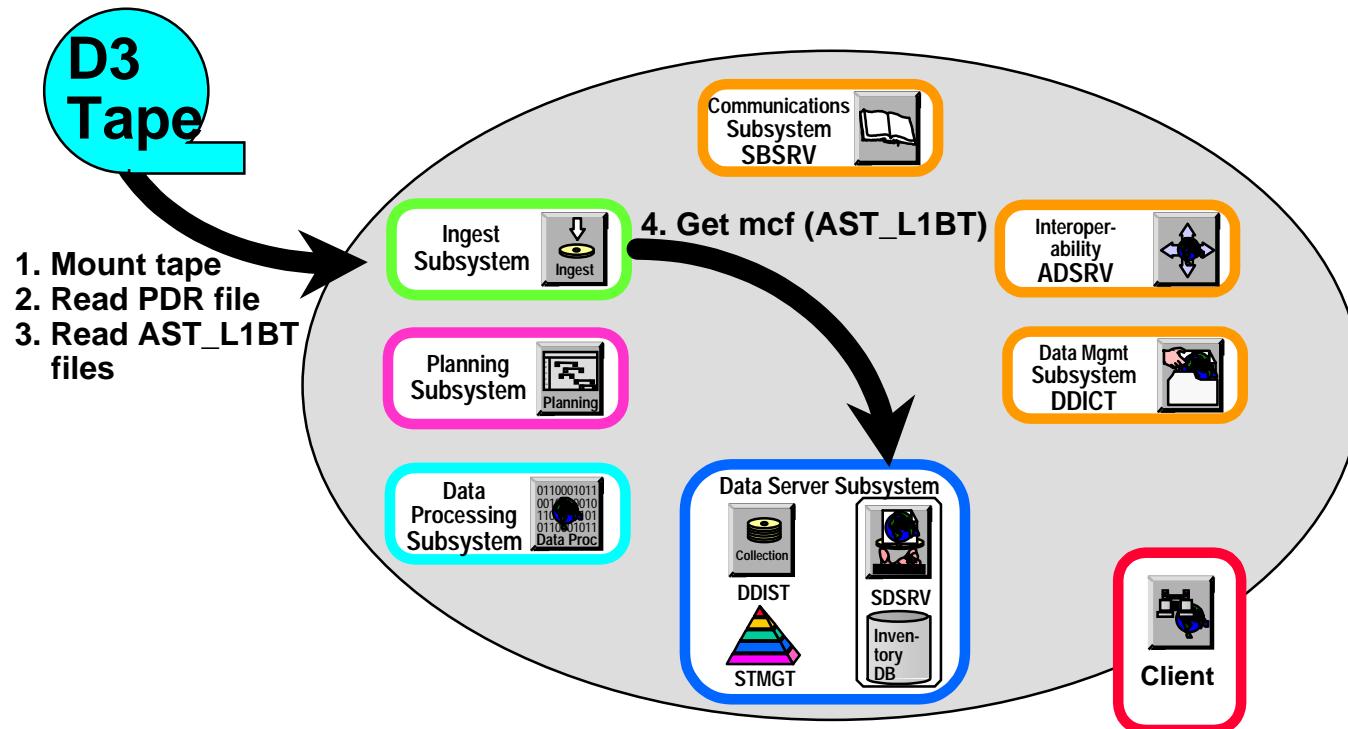


After receiving D3 tape from GDS, operator mounts tape and begins ingestion of data

# ASTER: D3 Tape Ingest Process



Some time later, after receiving D3 tape in a shipment,  
DAAC Operator mounts tape and begins ingest activities.  
Tape contains AST\_L1BT (L1B TIR) data.



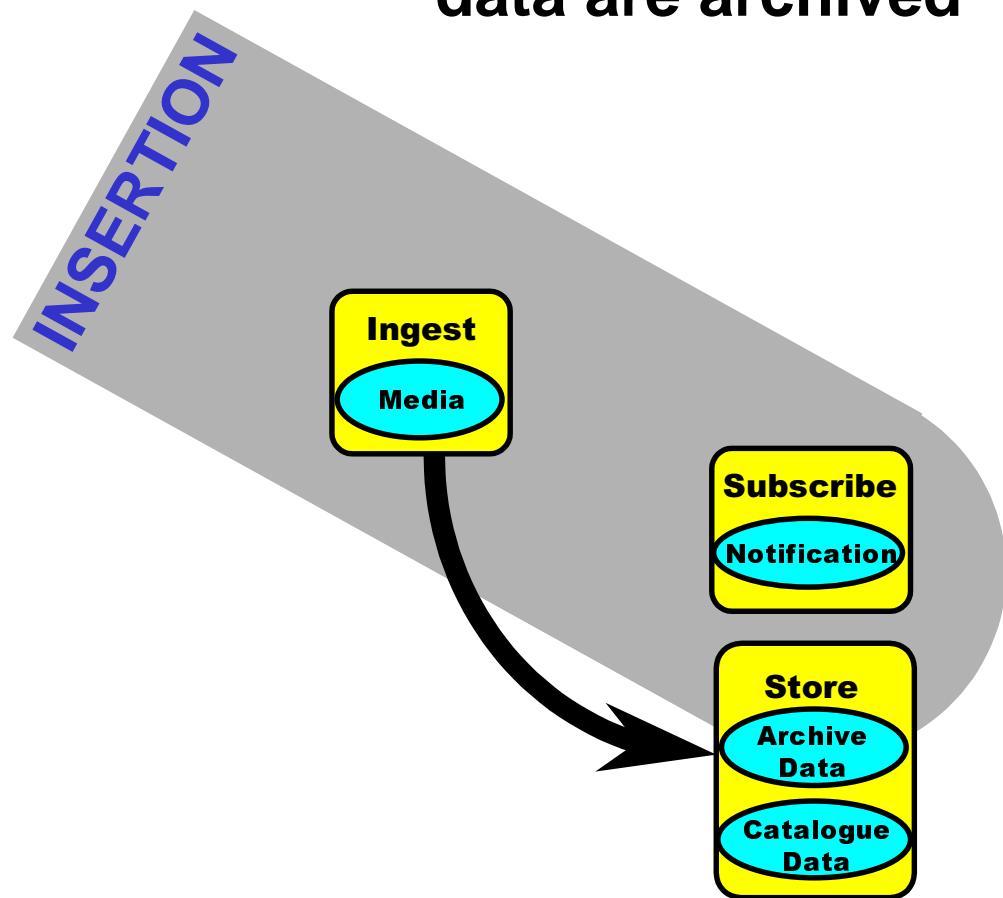
# ASTER: CSCI/Component Role in Ingest D3 Tape Operations



# DAR Support (Cont.)



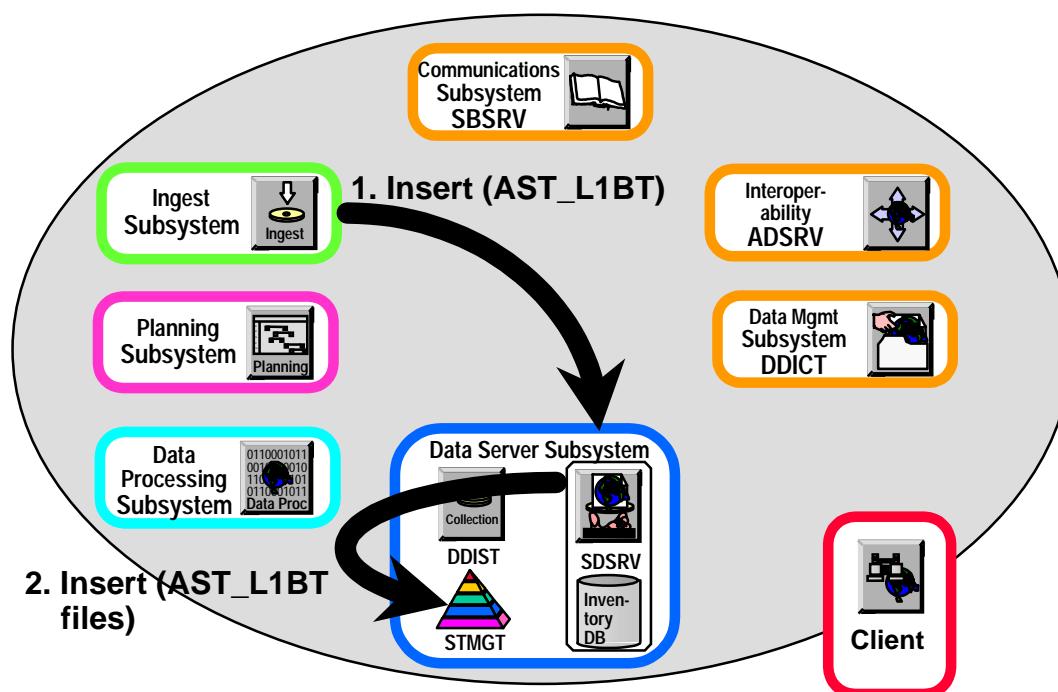
Ingested AST\_L1BT  
data are archived



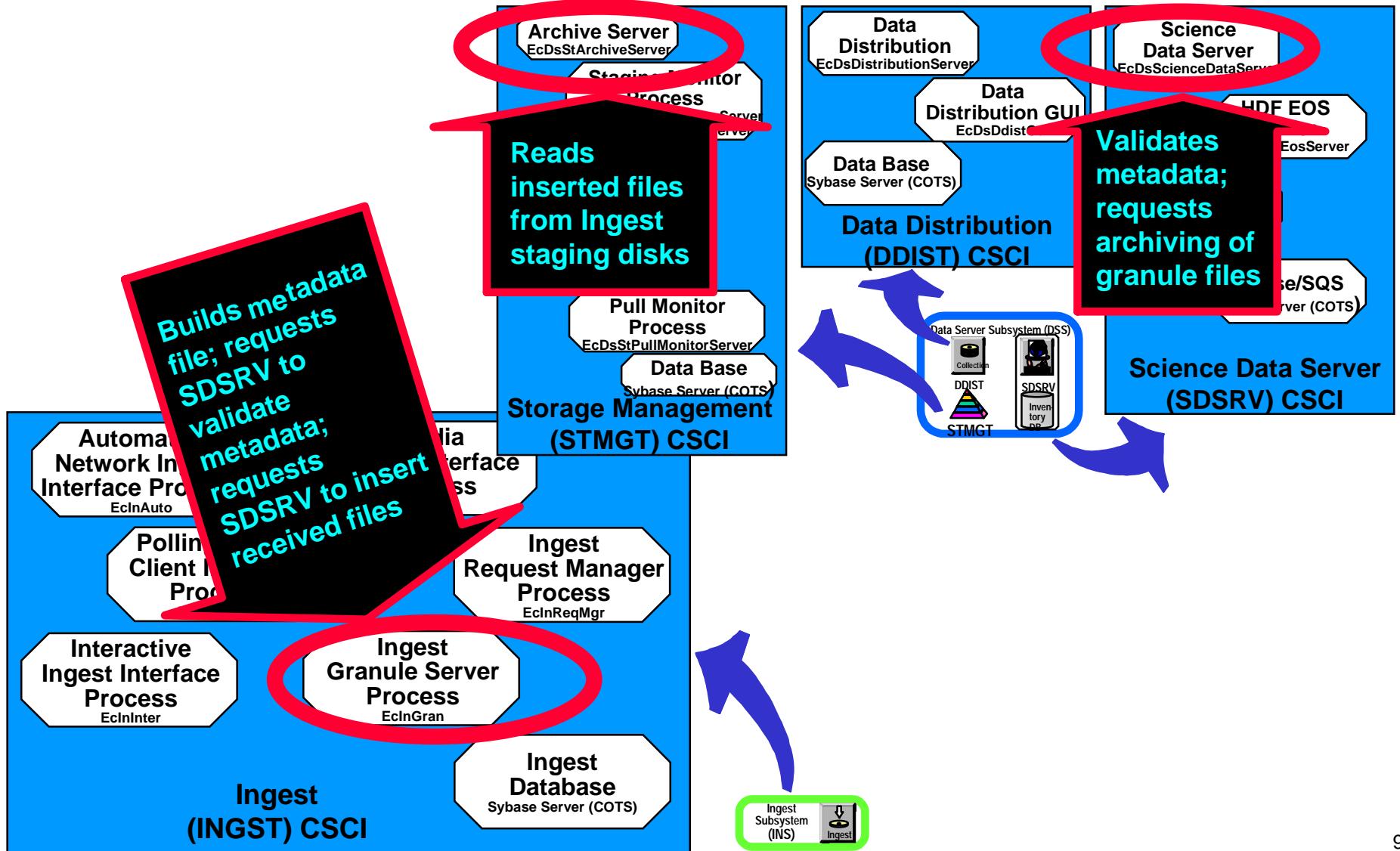
# ASTER: Ingest Archive Insertion Process



Archive AST\_L1BT (L1B TIR) data granules.



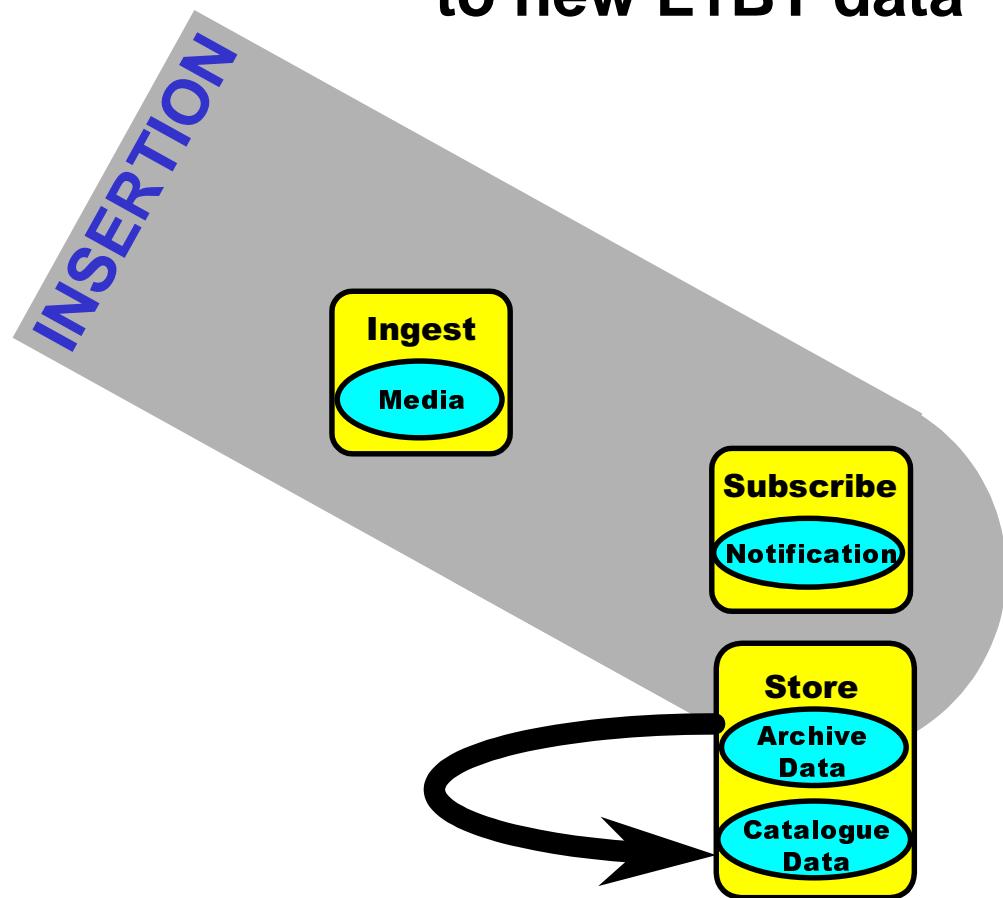
# ASTER: CSCI/Component Role in Ingest Archive Insertion



# DAR Support (Cont.)



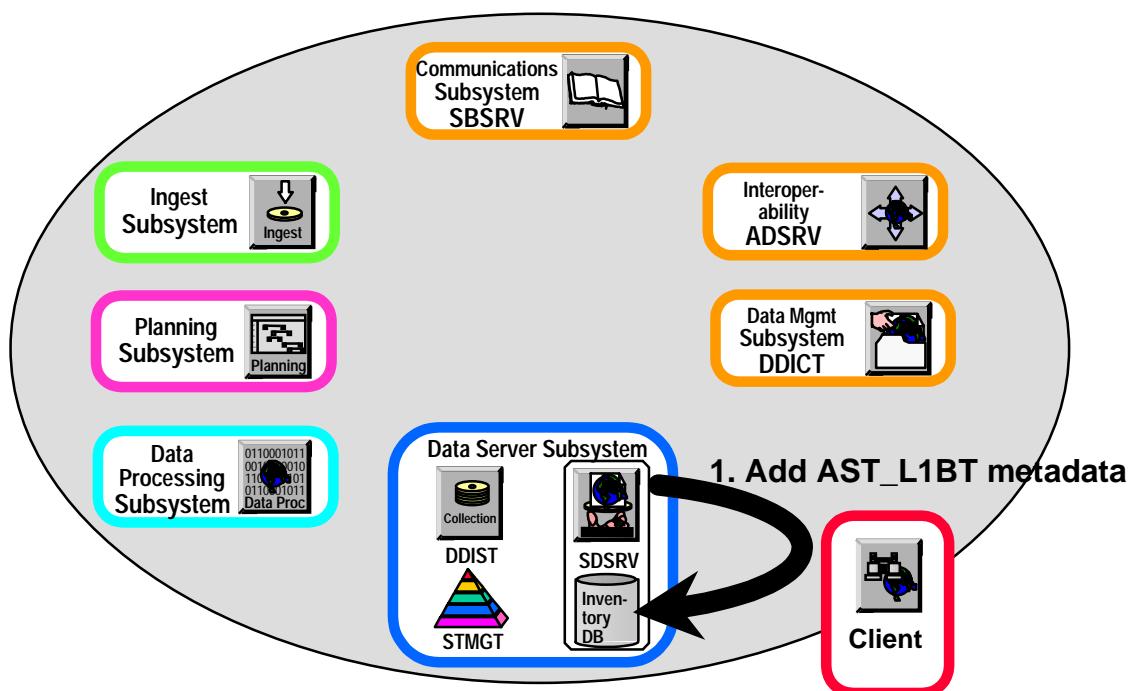
Update catalogue with reference  
to new L1BT data



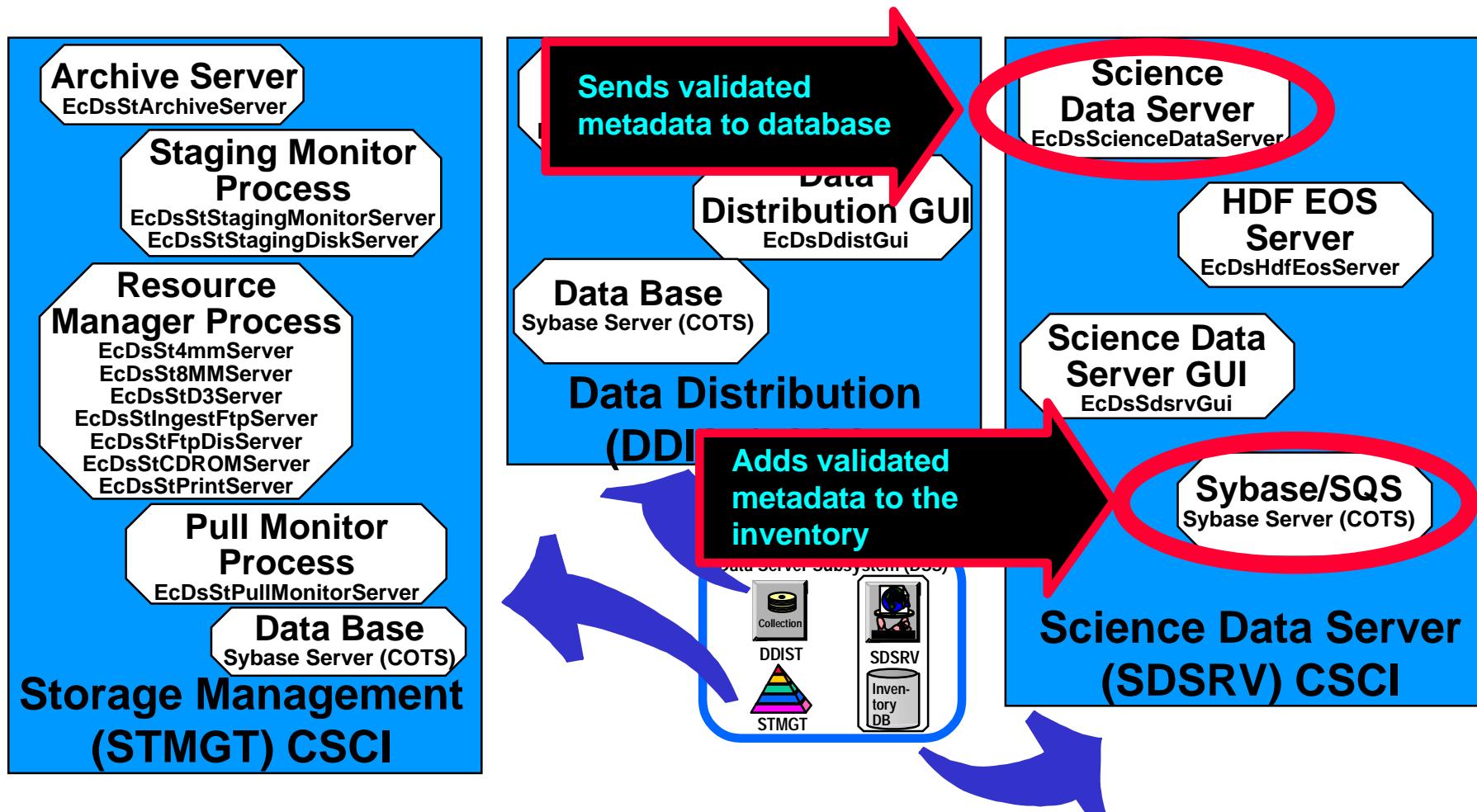
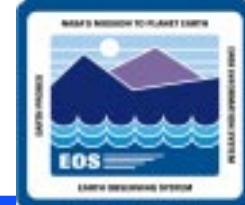
# ASTER: Inventory (Metadata) Update Process



Add metadata for AST\_L1BT (L1B TIR) data granules to the Sybase/SQS database.



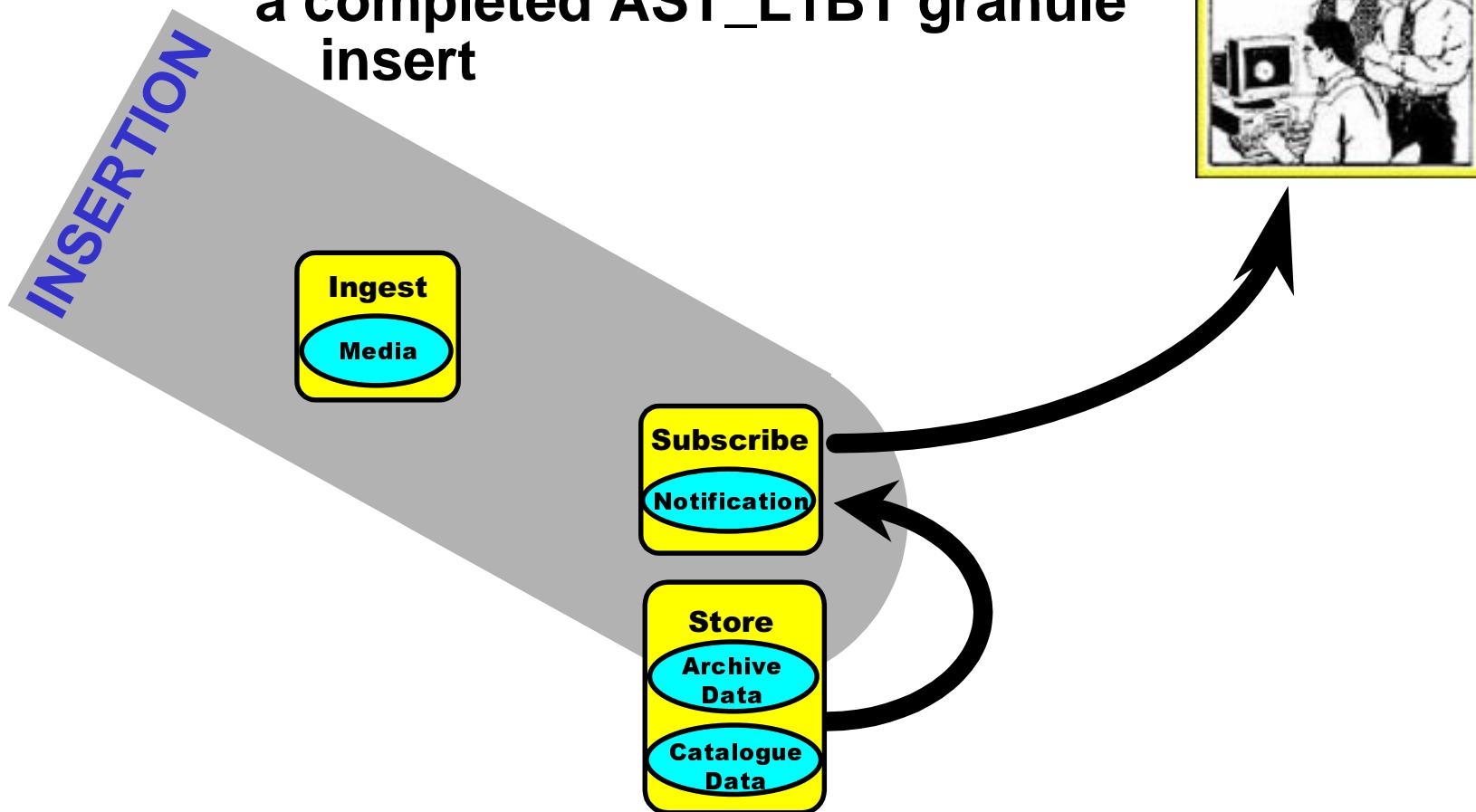
# ASTER: CSCI/Component Role in Inventory (Metadata) Update



# DAR Support (Cont.)



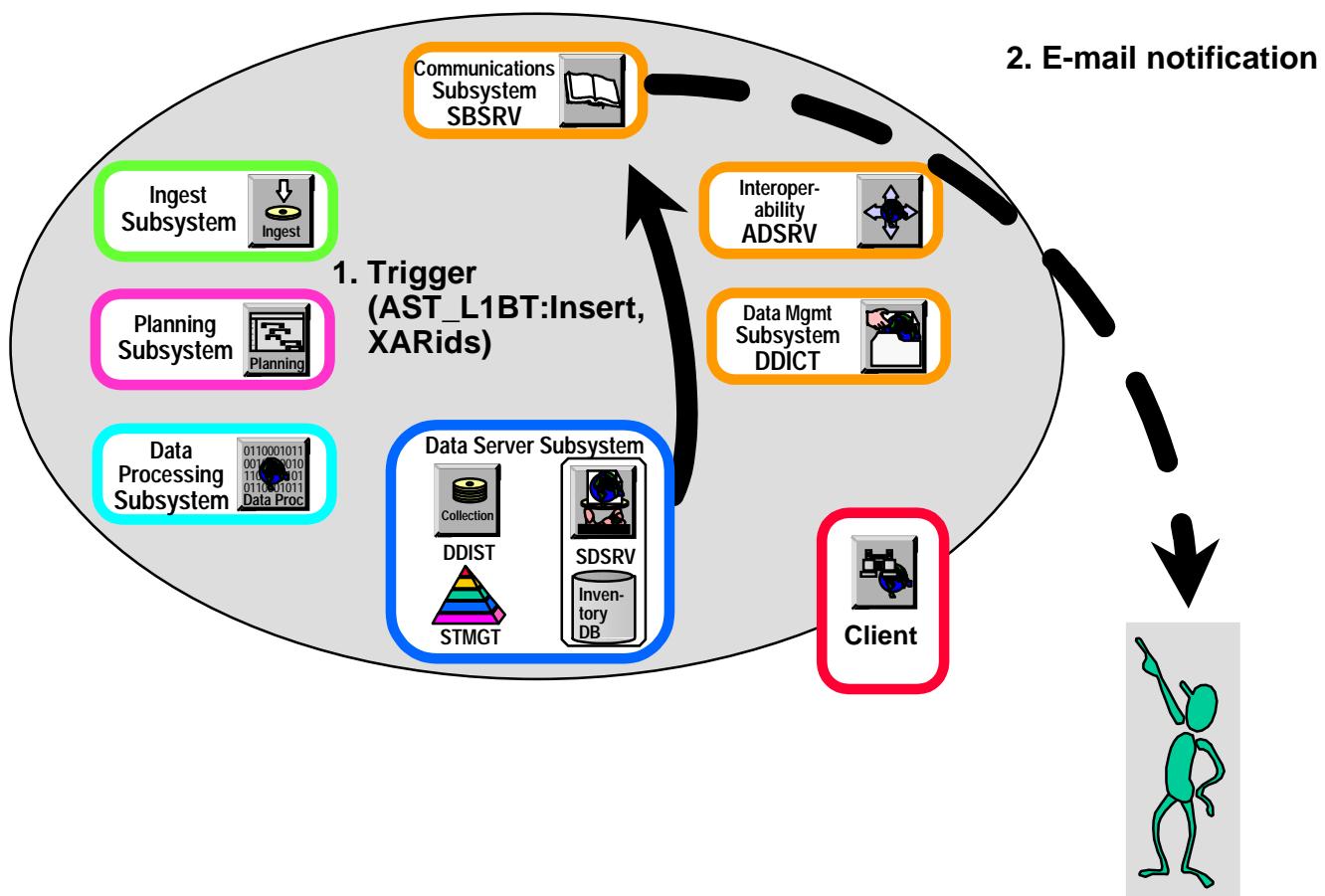
Insert terminates with an insert event notification to Subscribe. Subscribe e-mails ASTER Scientist notice of a completed AST\_L1BT granule insert



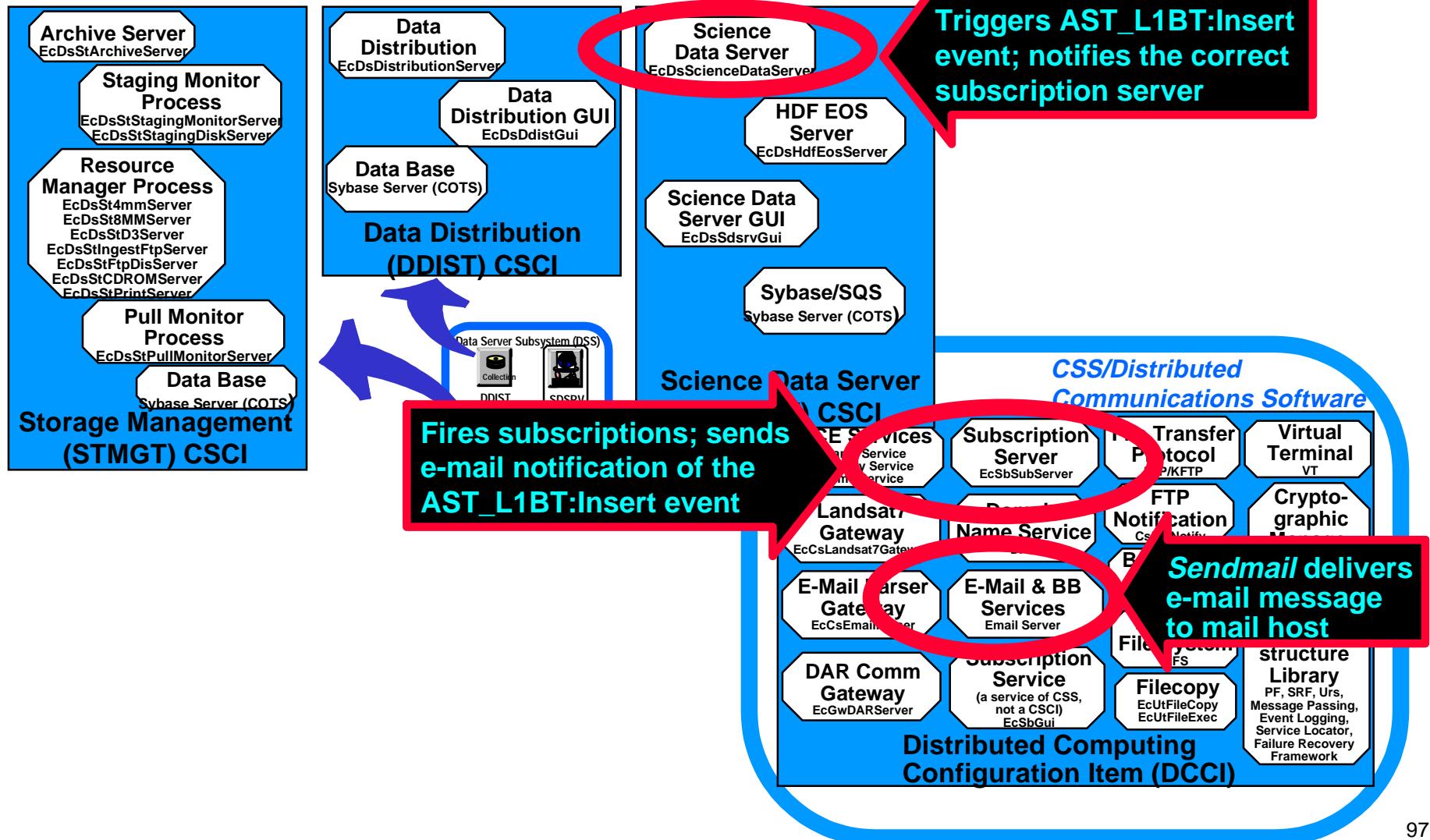
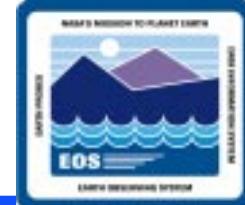
# ASTER: Event Notification Process



Notify all AST\_L1BT:Insert event subscribers whose DARid numbers are matched with the ingested granules.



# ASTER: CSCI/Component Role in Event Notification



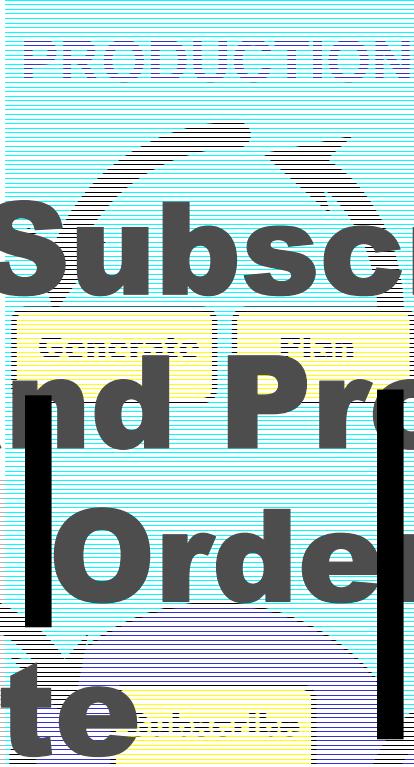
# ASTER Scenario: Backward Chaining



External  
Data Provider

User

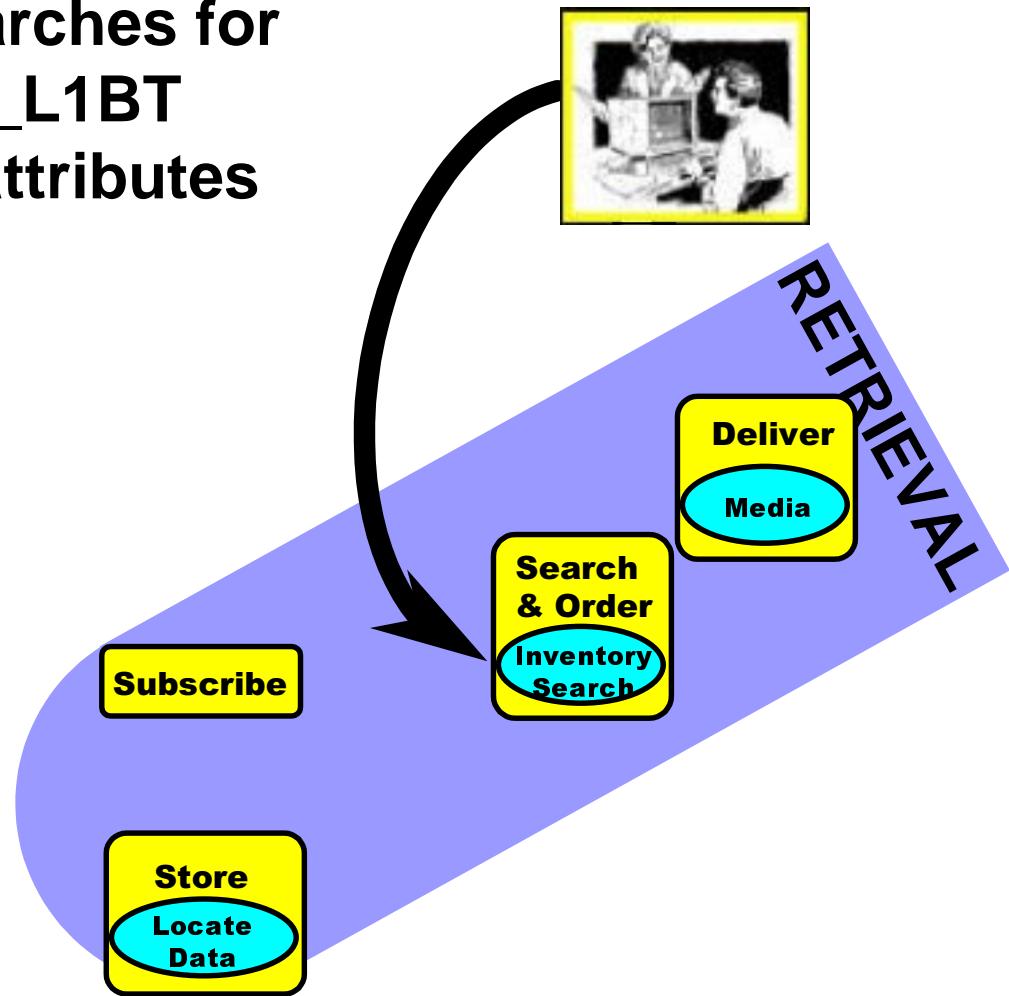
**Product Subscription**  
**On-demand Production**  
**Standing Order Delivery**  
**QA Update**



# Backward Chaining



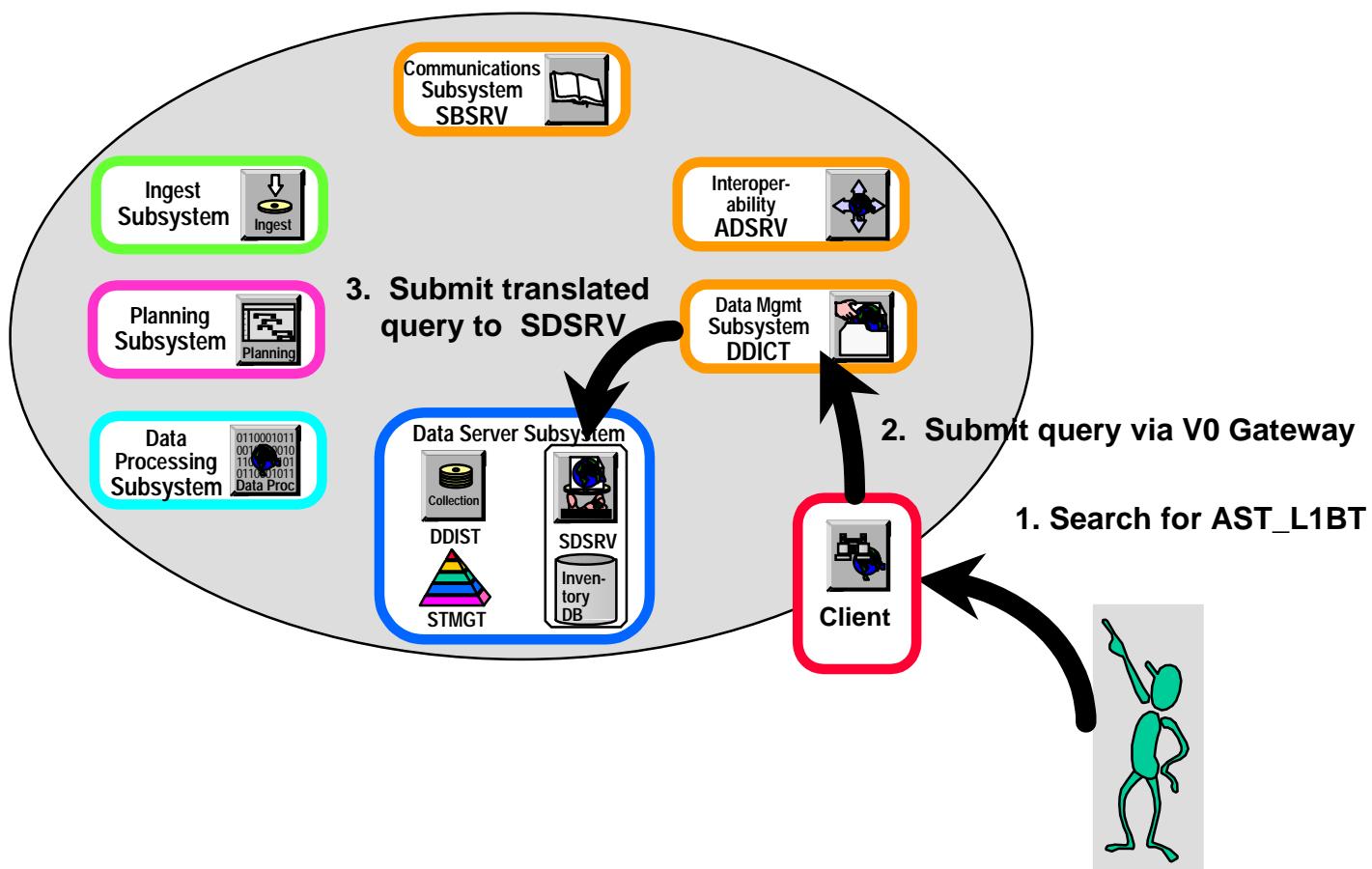
**ASTER Scientist searches for  
newly ingested AST\_L1BT  
granules, verifying attributes**



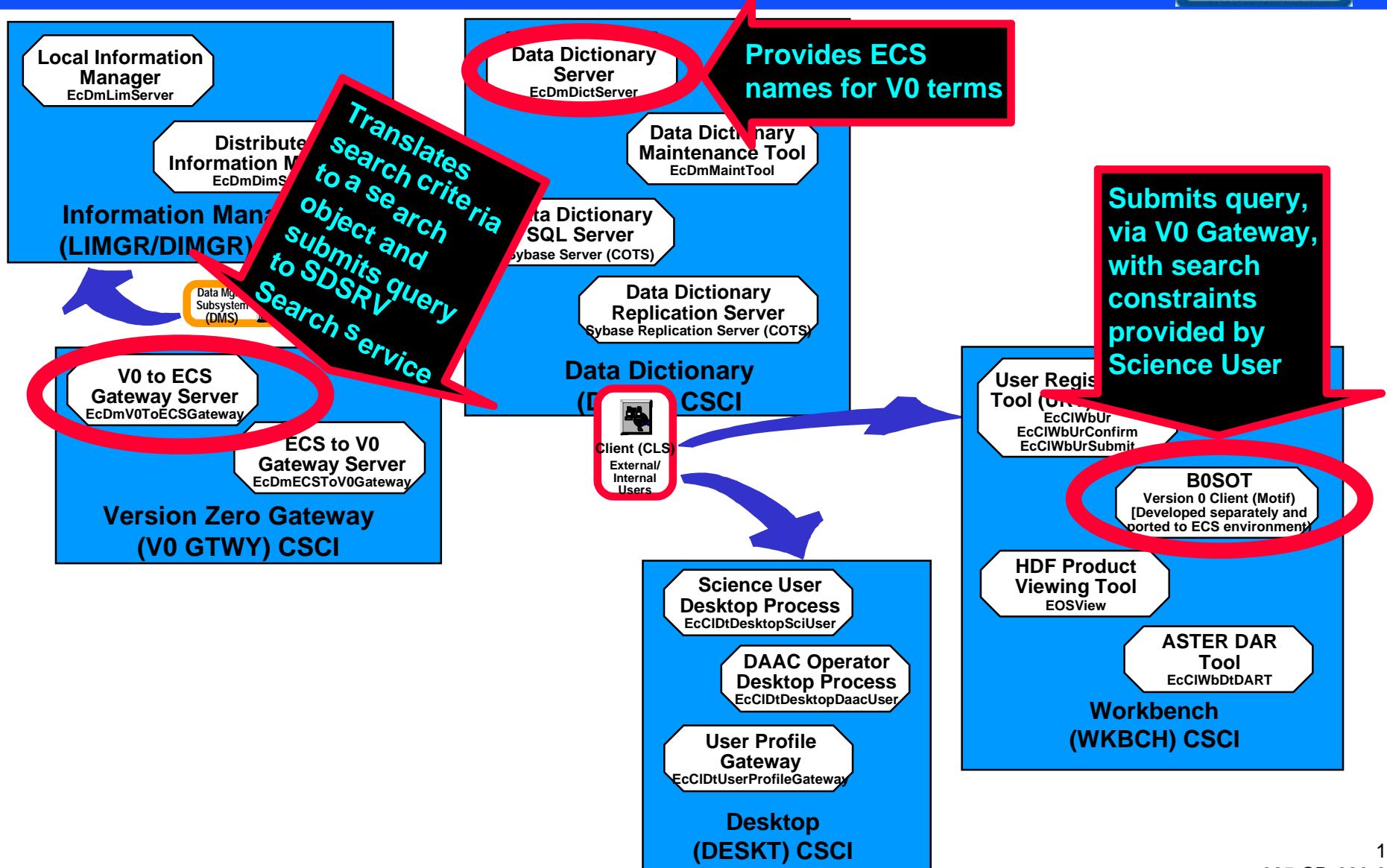
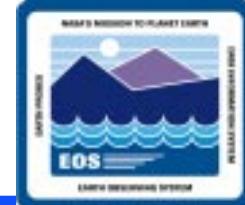
# ASTER: B0SOT Use Process



ASTER Scientist decides to check out the AST\_L1BT (L1B TIR) granule that was received. First, the scientist searches for the granule.



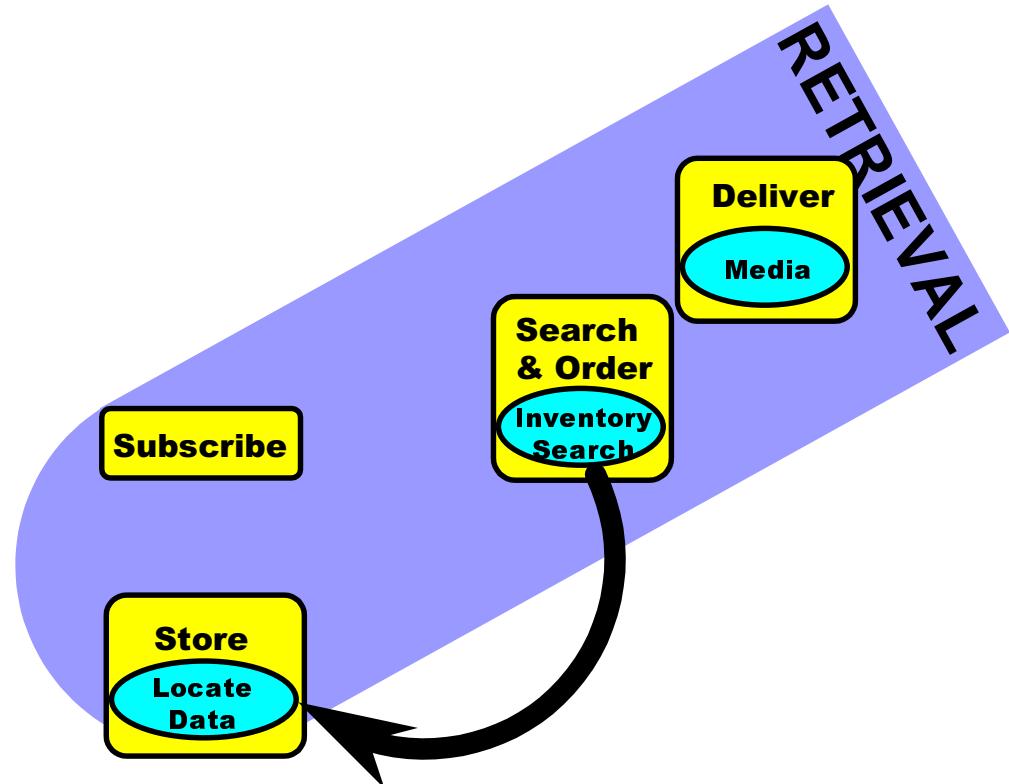
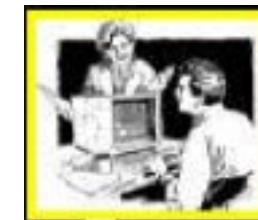
# ASTER: CSCl/Component Role in BOSOT Use



# Backward Chaining (Cont.)



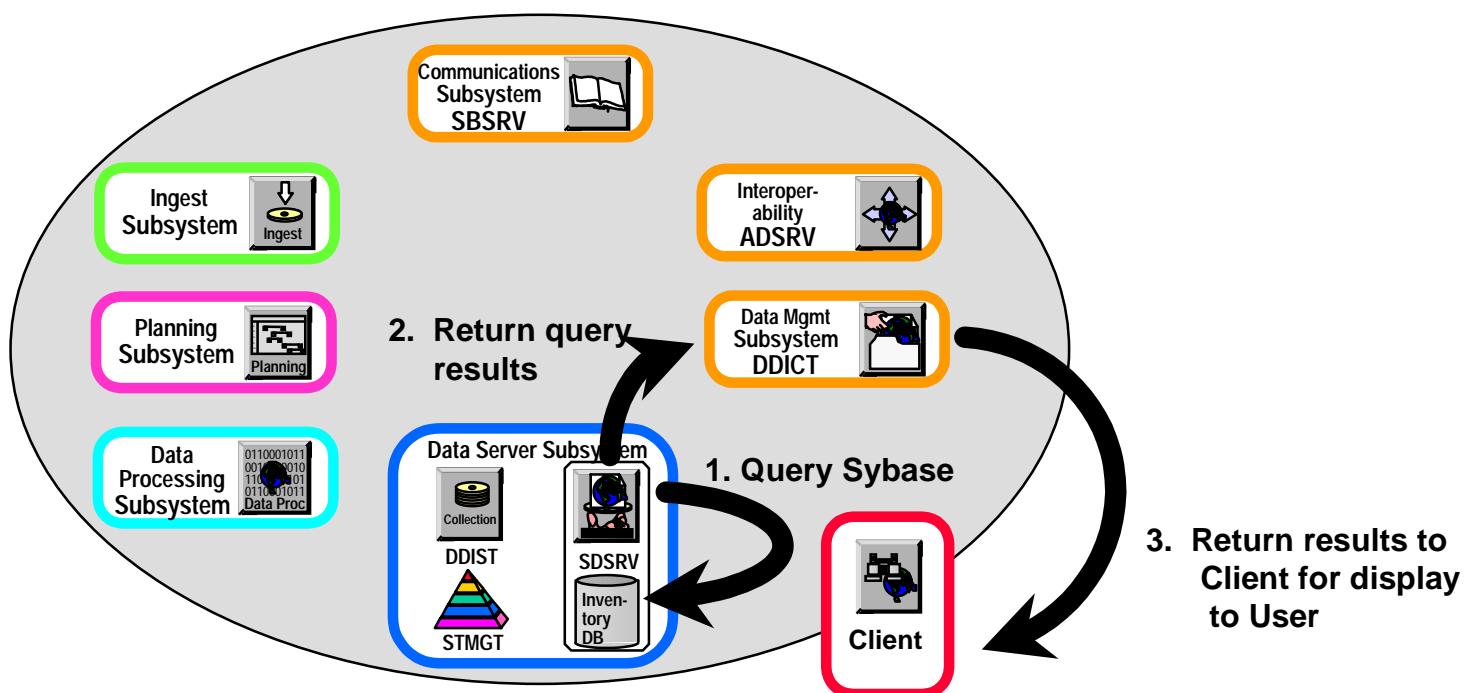
Locate AST\_L1BT granules of interest



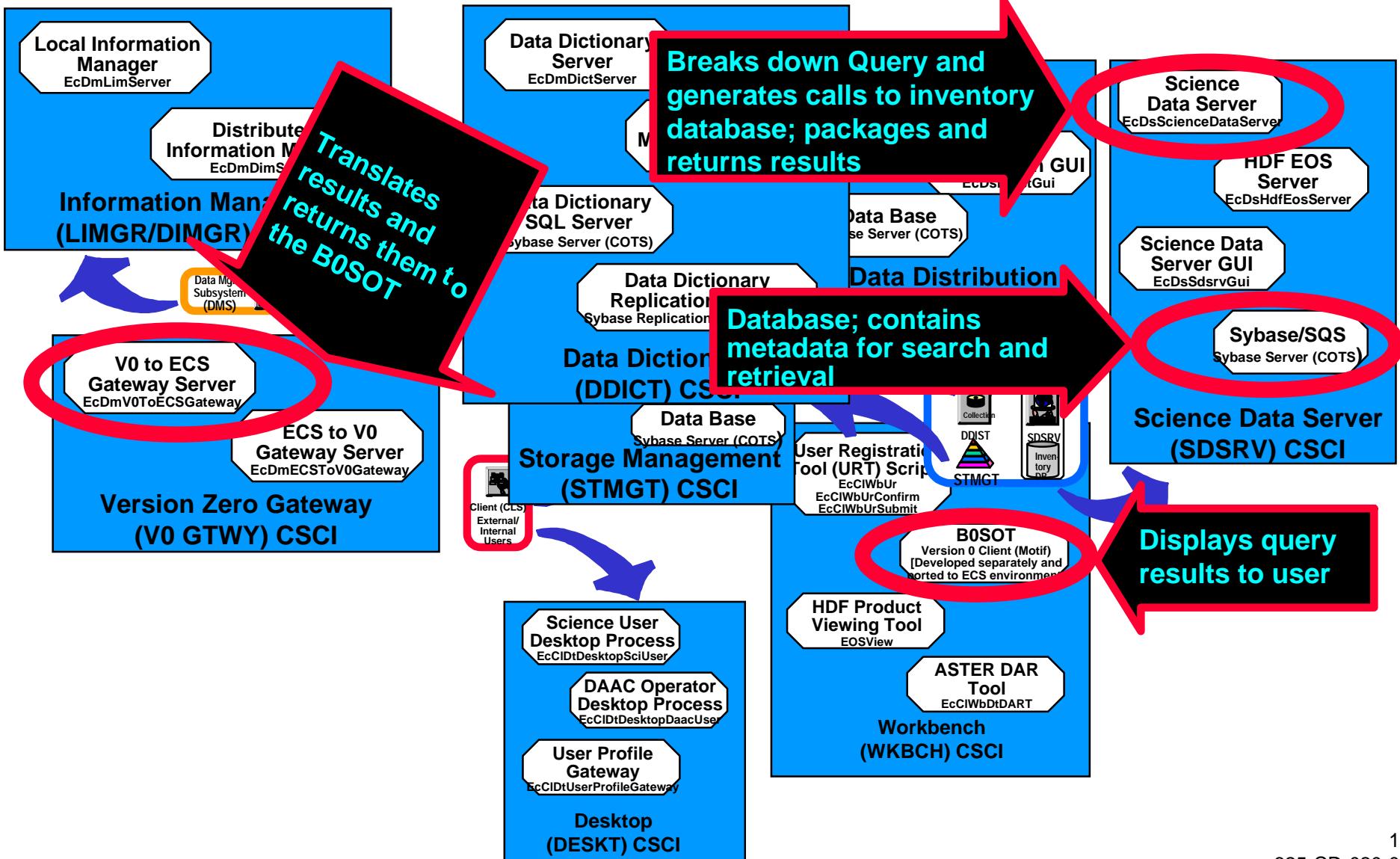
# ASTER: Data Search Process



SDSRV queries Sybase/SQS database for AST\_L1BT (L1B TIR) granules meeting search criteria.



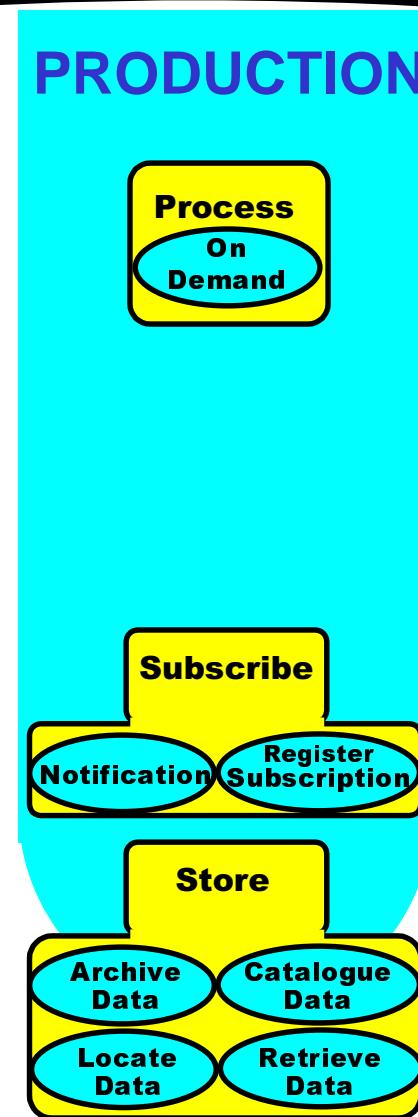
# ASTER: CSCI/Component Role in Data Search



# Backward Chaining (Cont.)



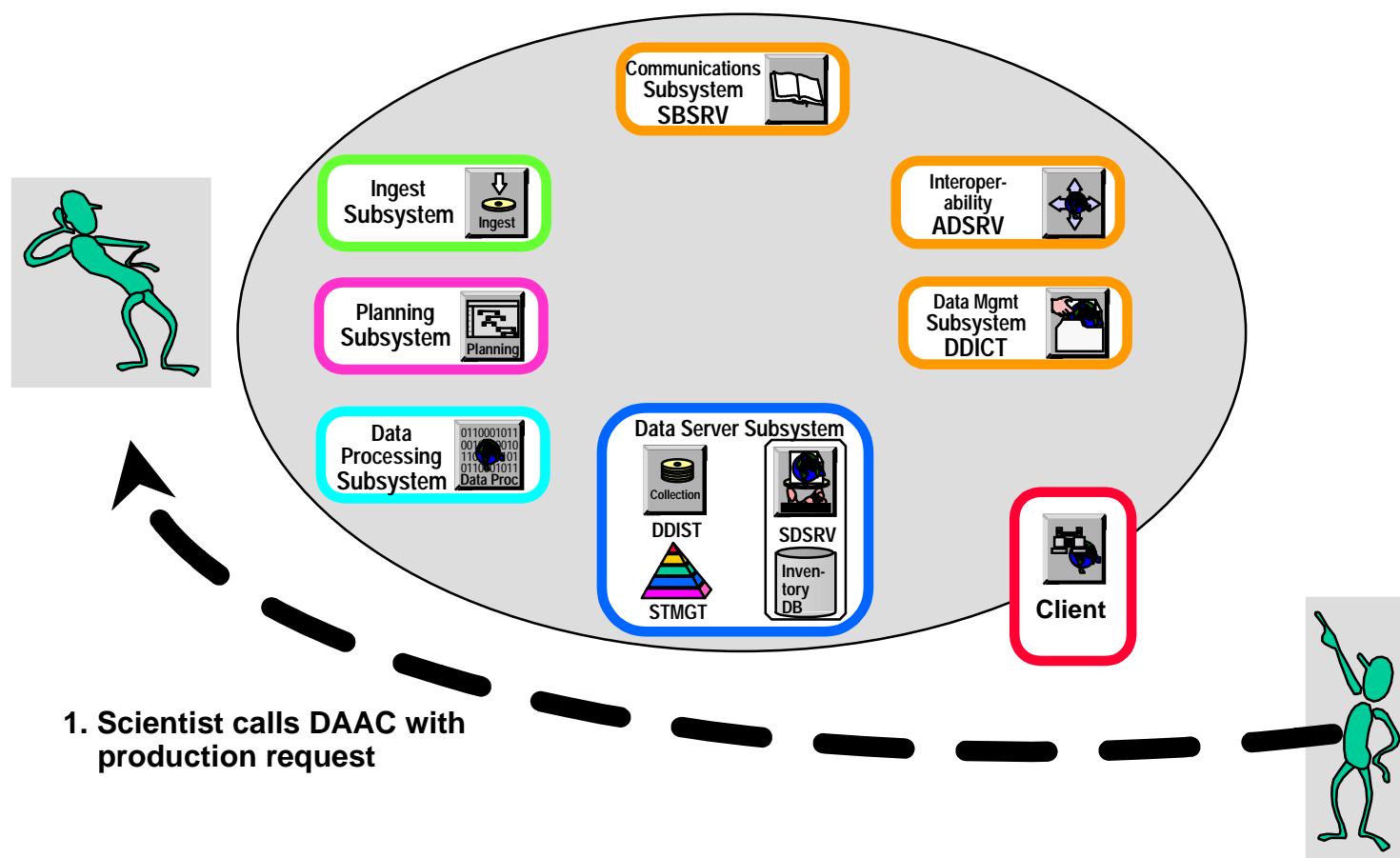
ASTER Scientist  
calls DAAC  
requesting  
AST\_08 to be  
produced from  
AST\_L1BT using  
ETS algorithm



# ASTER: On-Demand Production Request Process



Scientist calls DAAC requesting AST\_L1BT (L1B TIR) be generated into an AST\_08 (L2 Surface Temperature) product using ETS algorithm.

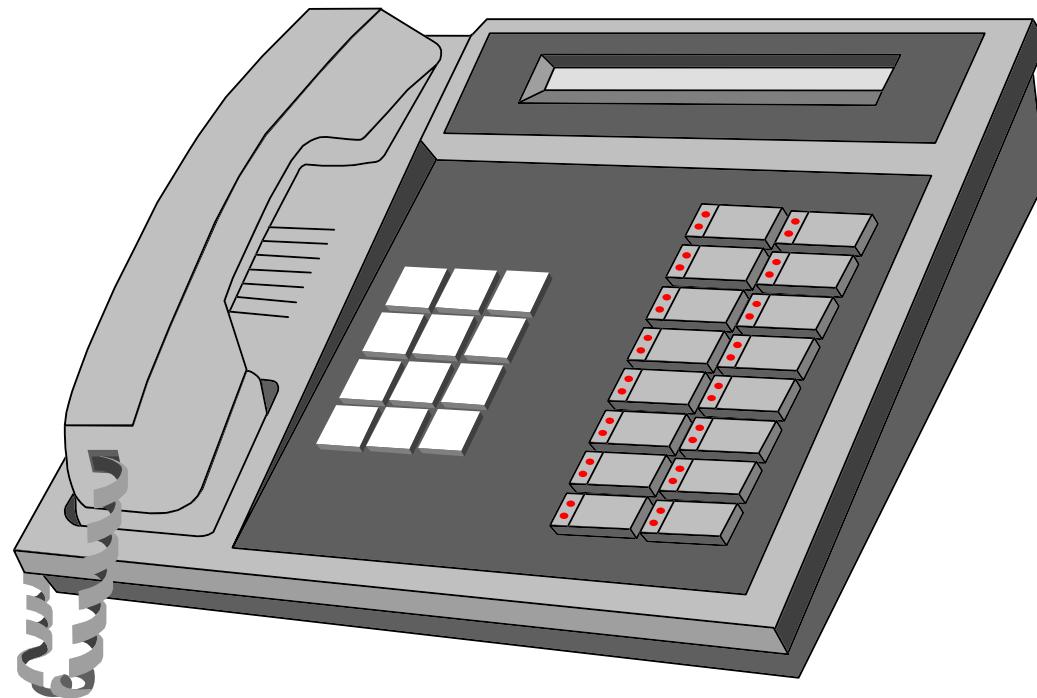


1. Scientist calls DAAC with production request

# ASTER: CSCI/Component Role in On-Demand Production Request



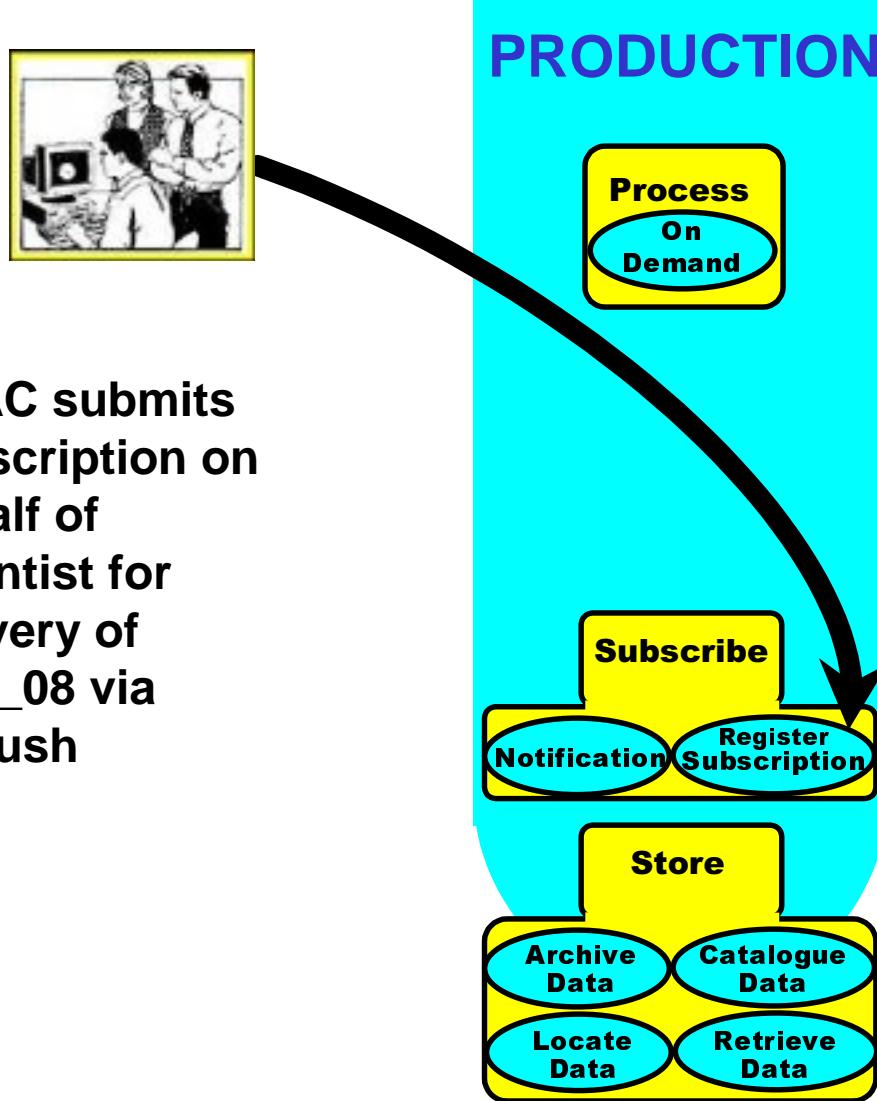
No CSCI/Components involved.



# Backward Chaining (Cont.)



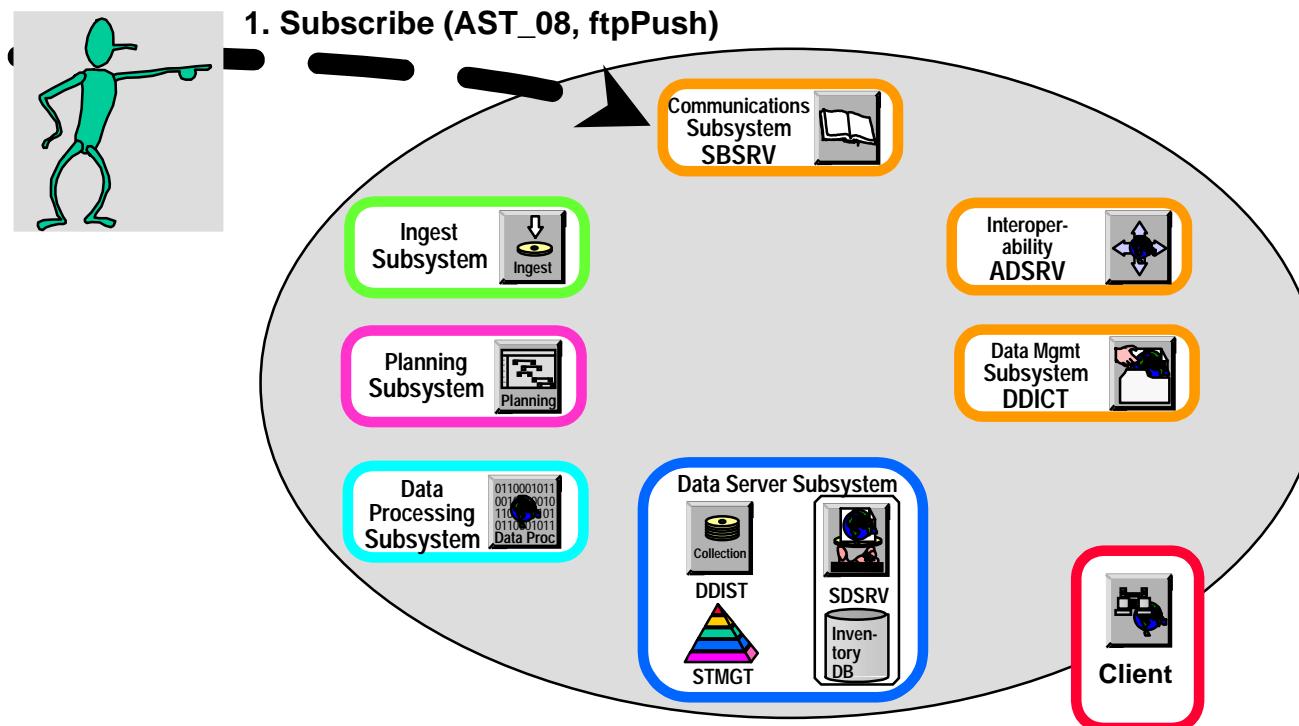
DAAC submits  
subscription on  
behalf of  
scientist for  
delivery of  
**AST\_08** via  
ftpPush



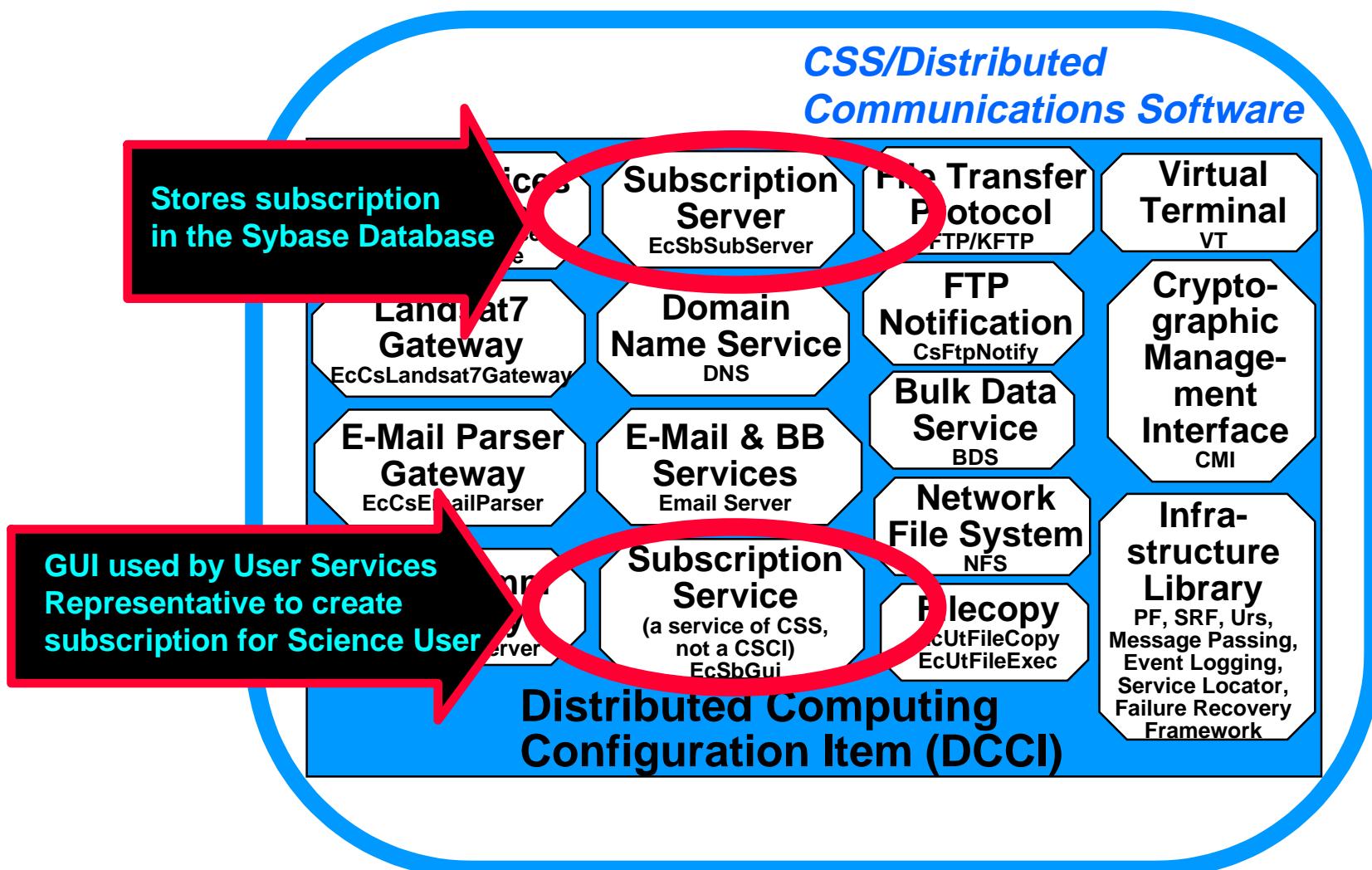
# ASTER: User Subscription Registration Process



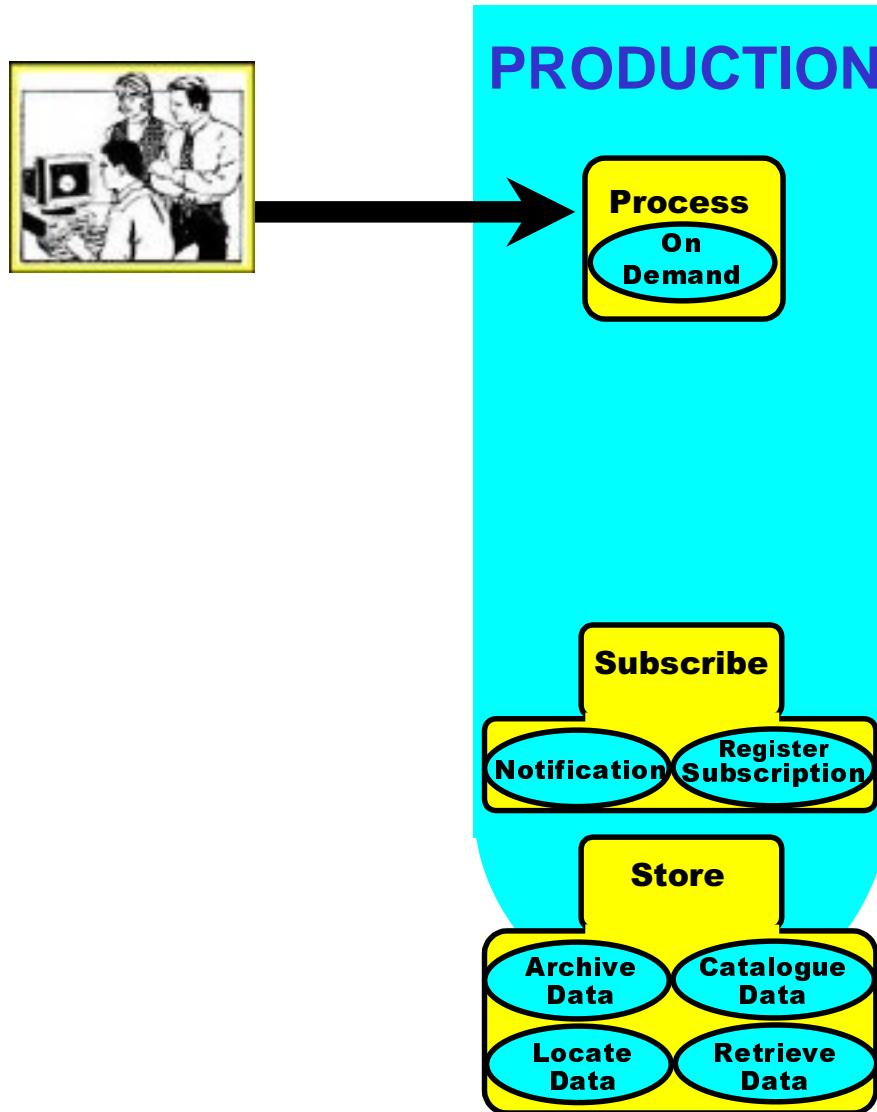
DAAC enters subscription, on behalf of scientist, for delivery of AST\_08 (L2 Surface Temperature) product, via ftpPush, when product is generated.



# ASTER: CSCI/Component Role in User Subscription Registration

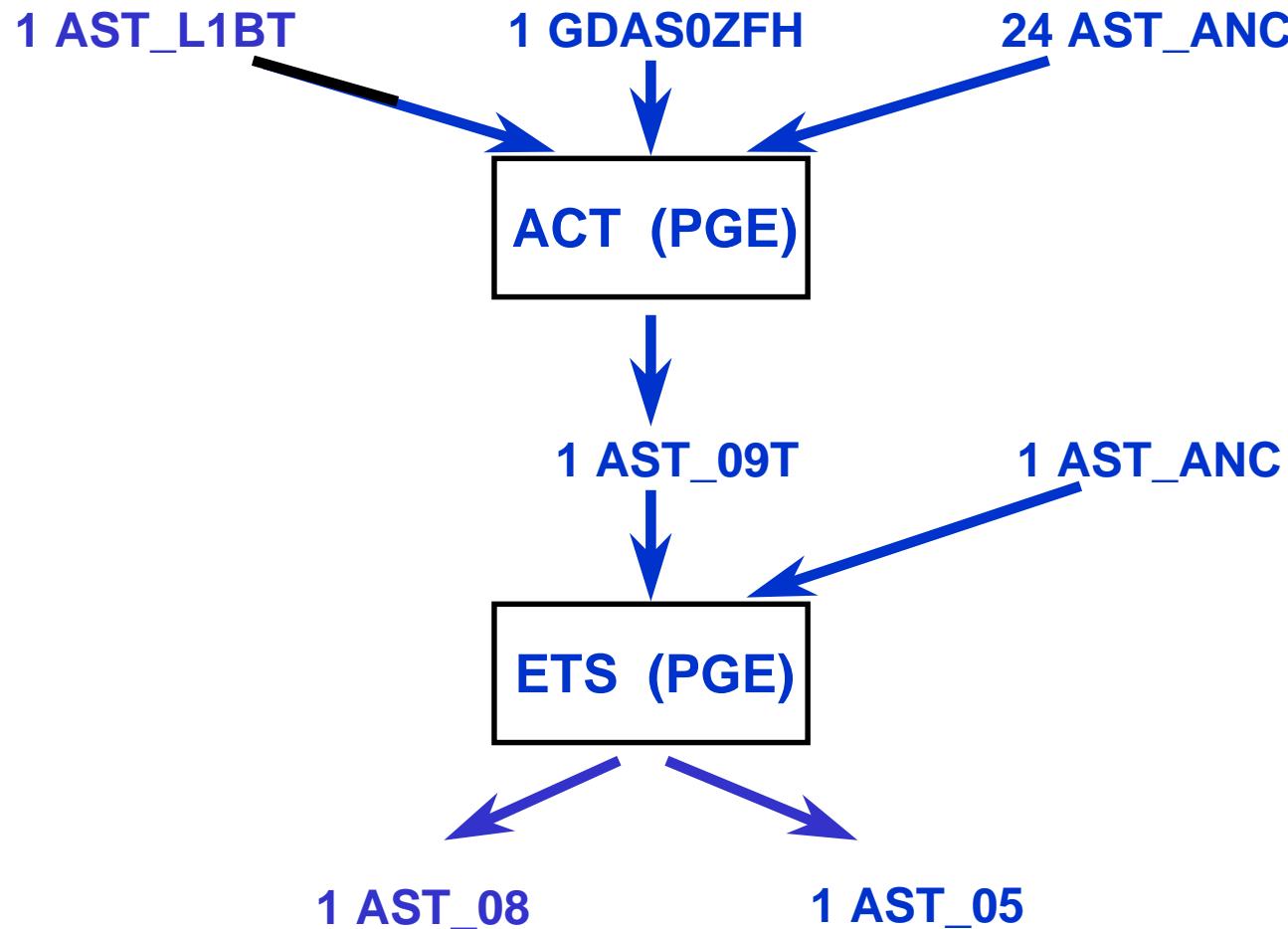


# Backward Chaining (Cont.)



Operator determines need to run ACT PGE before ETS. Submits production request for ACT and ETS, and then initiates production

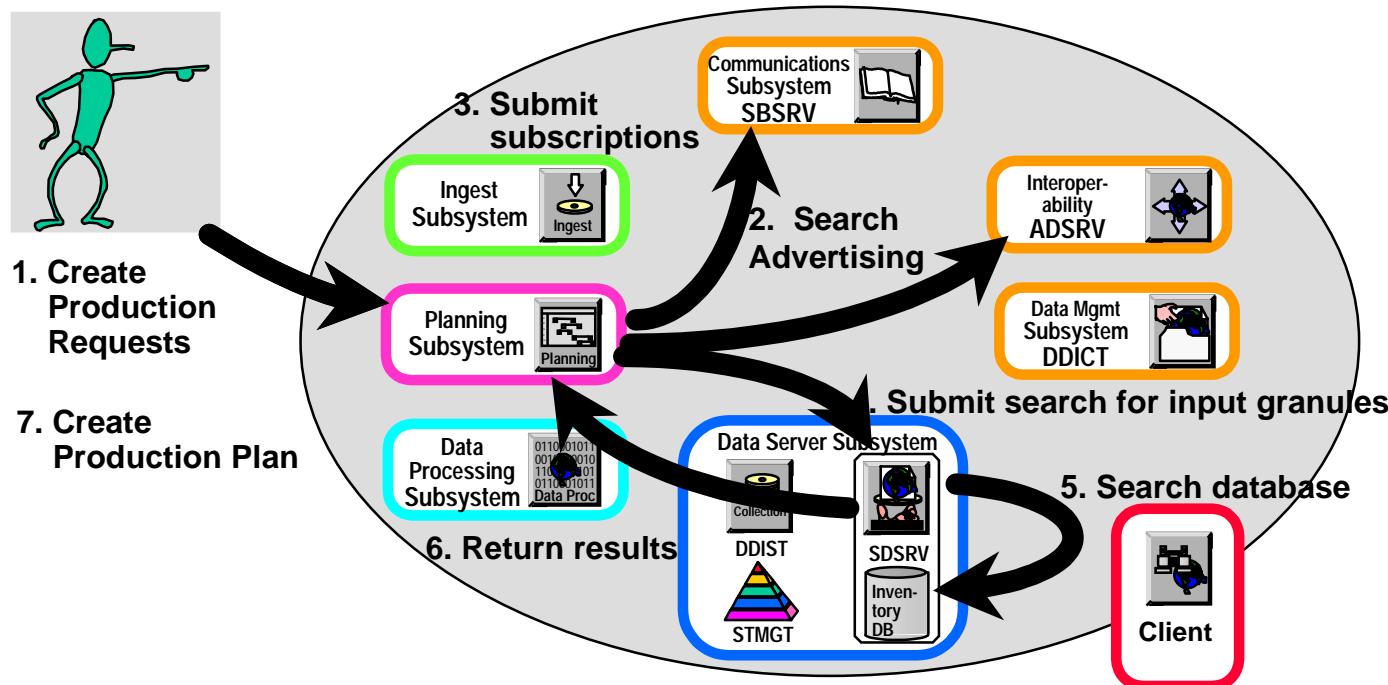
# ASTER: PGE Chaining



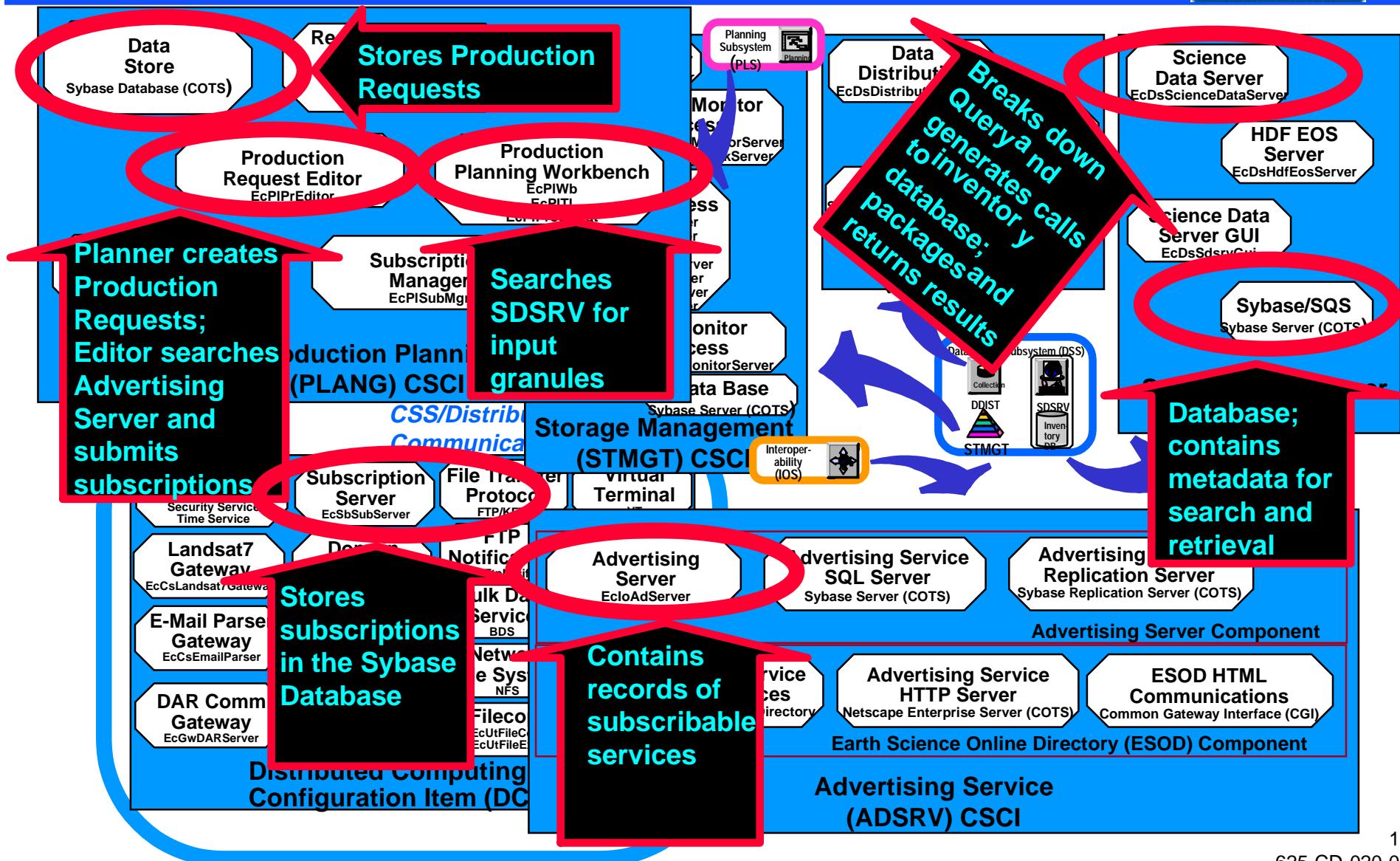
# ASTER: Production Request Process



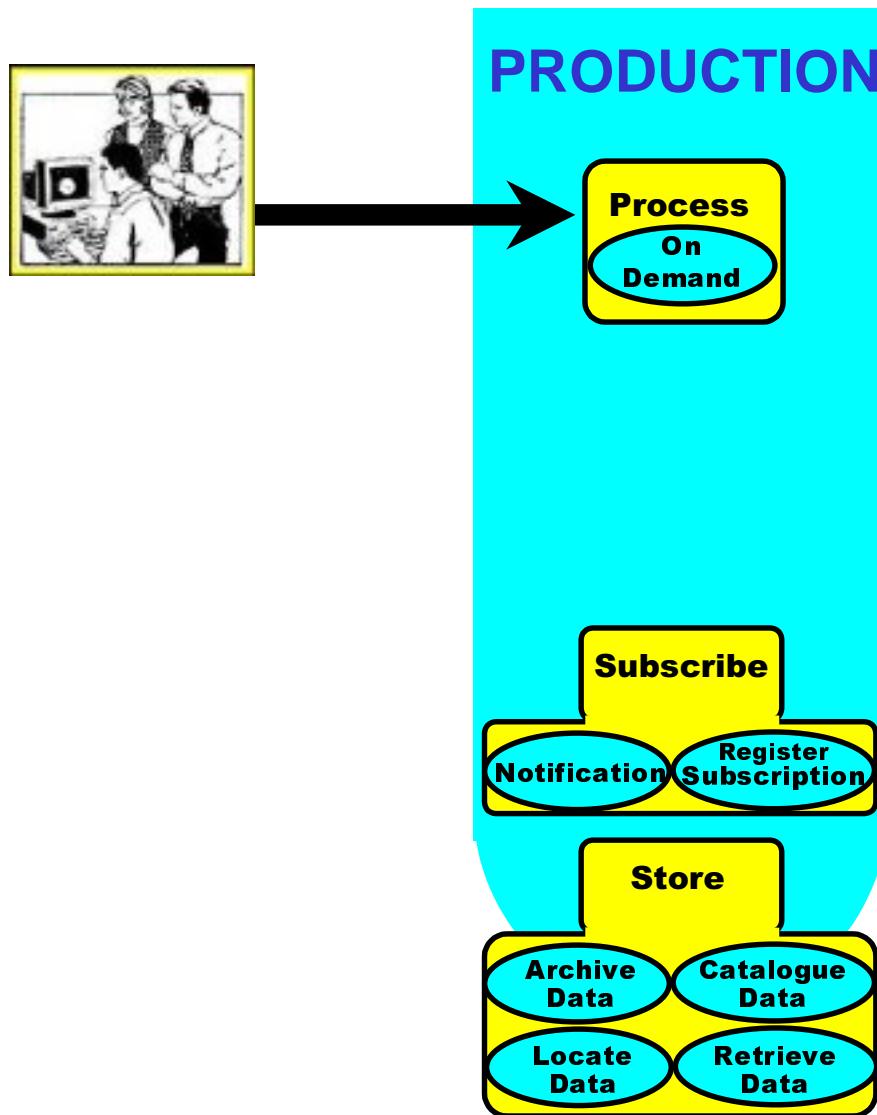
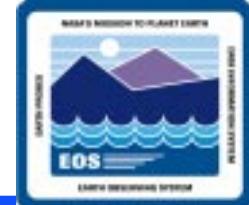
Operator determines that, in order to run ETS algorithm on AST\_L1BT (L1B TIR), ACT algorithm must be run first. Operator then creates production requests and a plan which includes a DPR for the ACT, with the AST\_09 (L2 Surface Radiance TIR) output feeding the ETS algorithm.



# ASTER: CSCI/Component Role in Production Request



# Backward Chaining (Cont.)

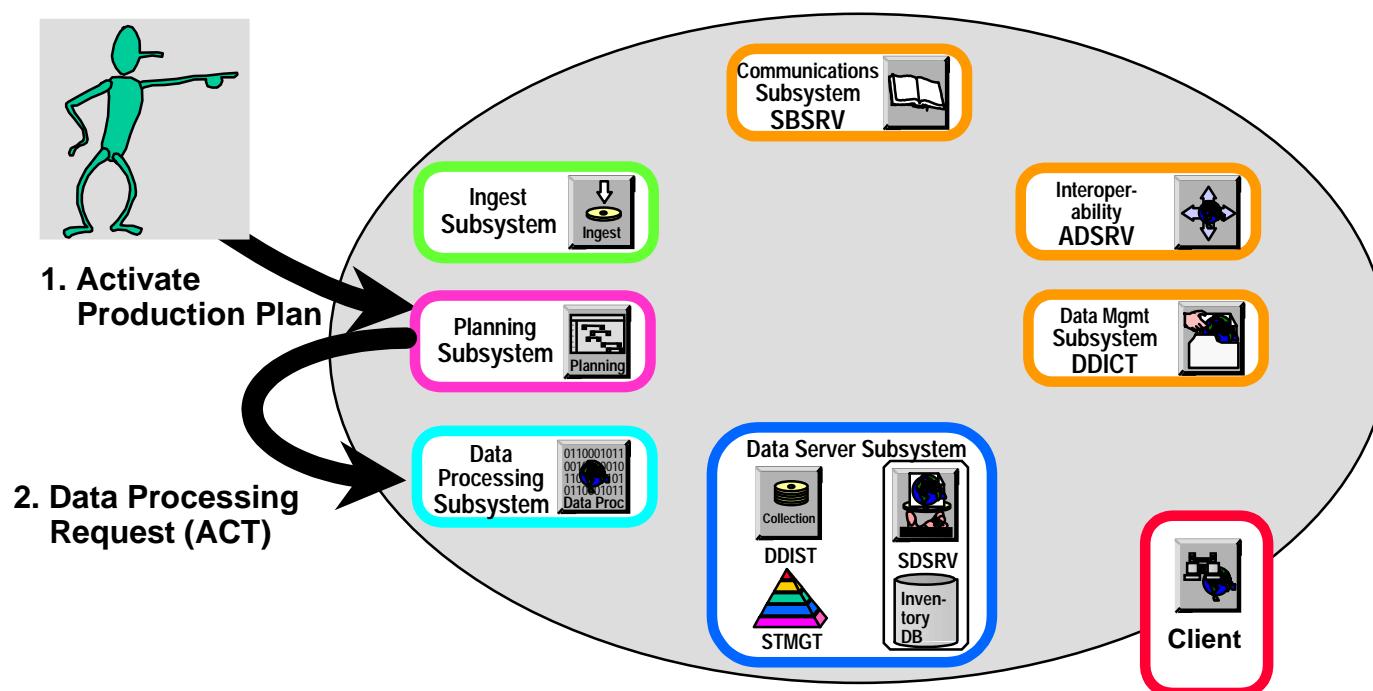


Operator activates Plan which includes Data Processing Requests (DPRs) for ACT and ETS PGEs

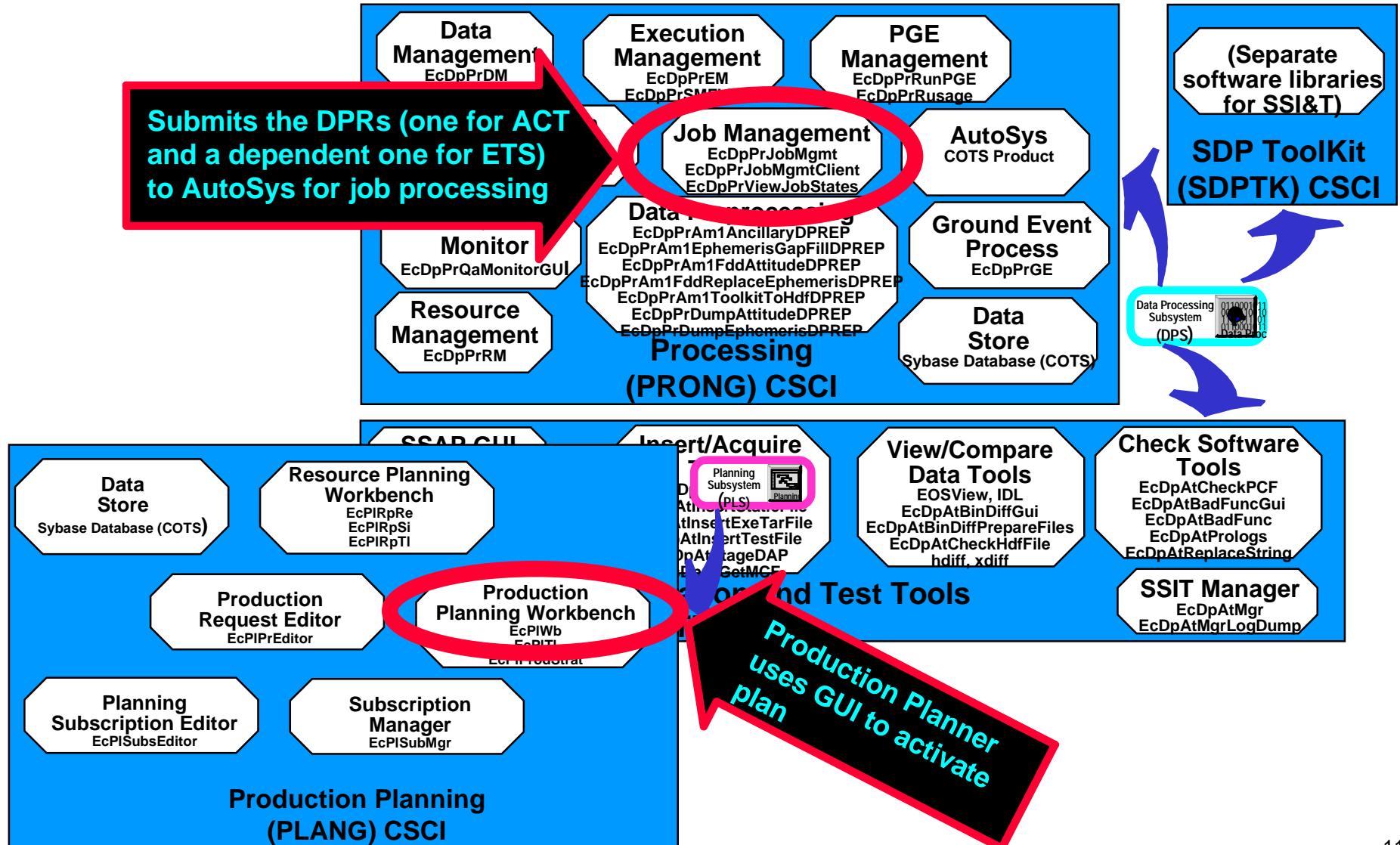
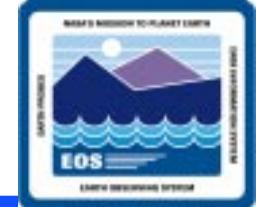
# ASTER: Plan Activation Process



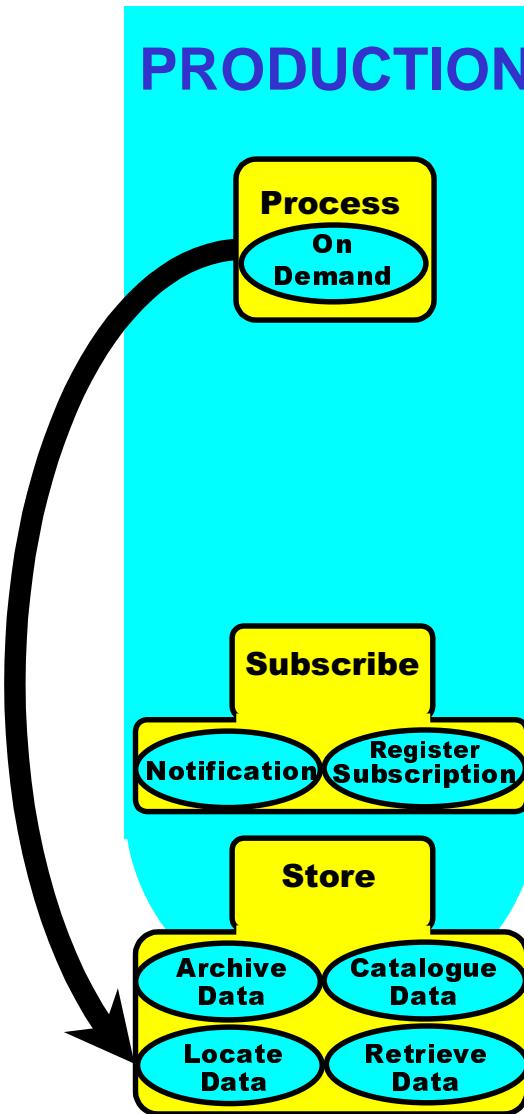
Production Planner interacts with the Planning Workbench GUI to create a plan with DPRs for the ACT and ETS PGEs and make it the current processing plan.



# ASTER: CSCI/Component Role in Plan Activation



# Backward Chaining (Cont.)

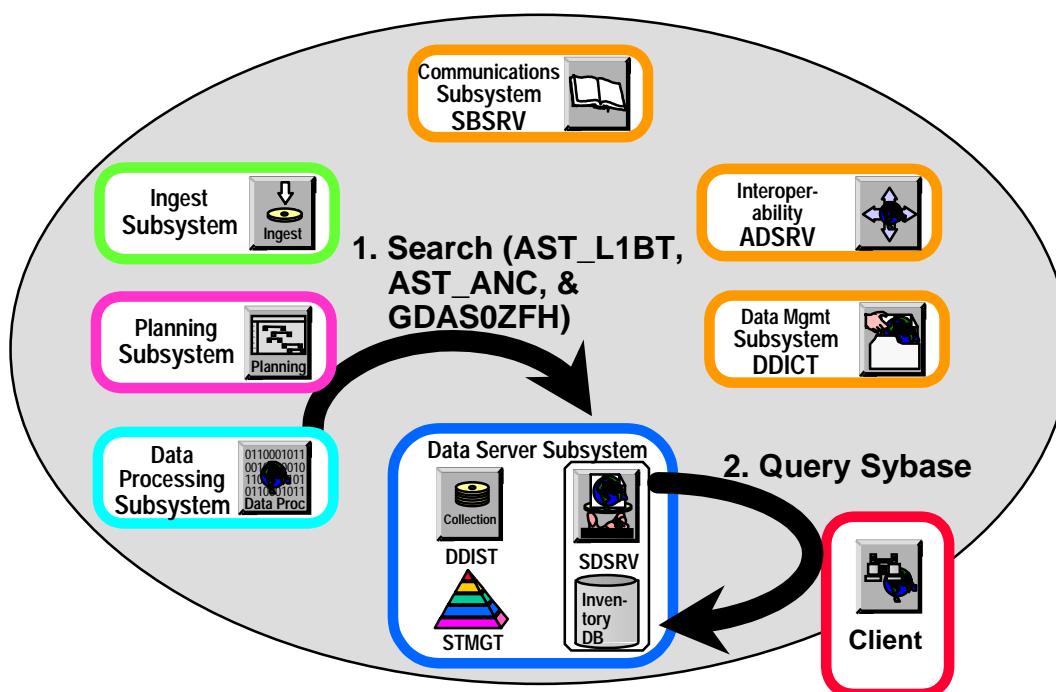


Job locates  
AST\_L1B,  
AST\_ANC  
(ASTER ancillary  
data set), and  
GDAS0ZFH  
(NCEP ancillary)  
data required for  
ACT algorithm

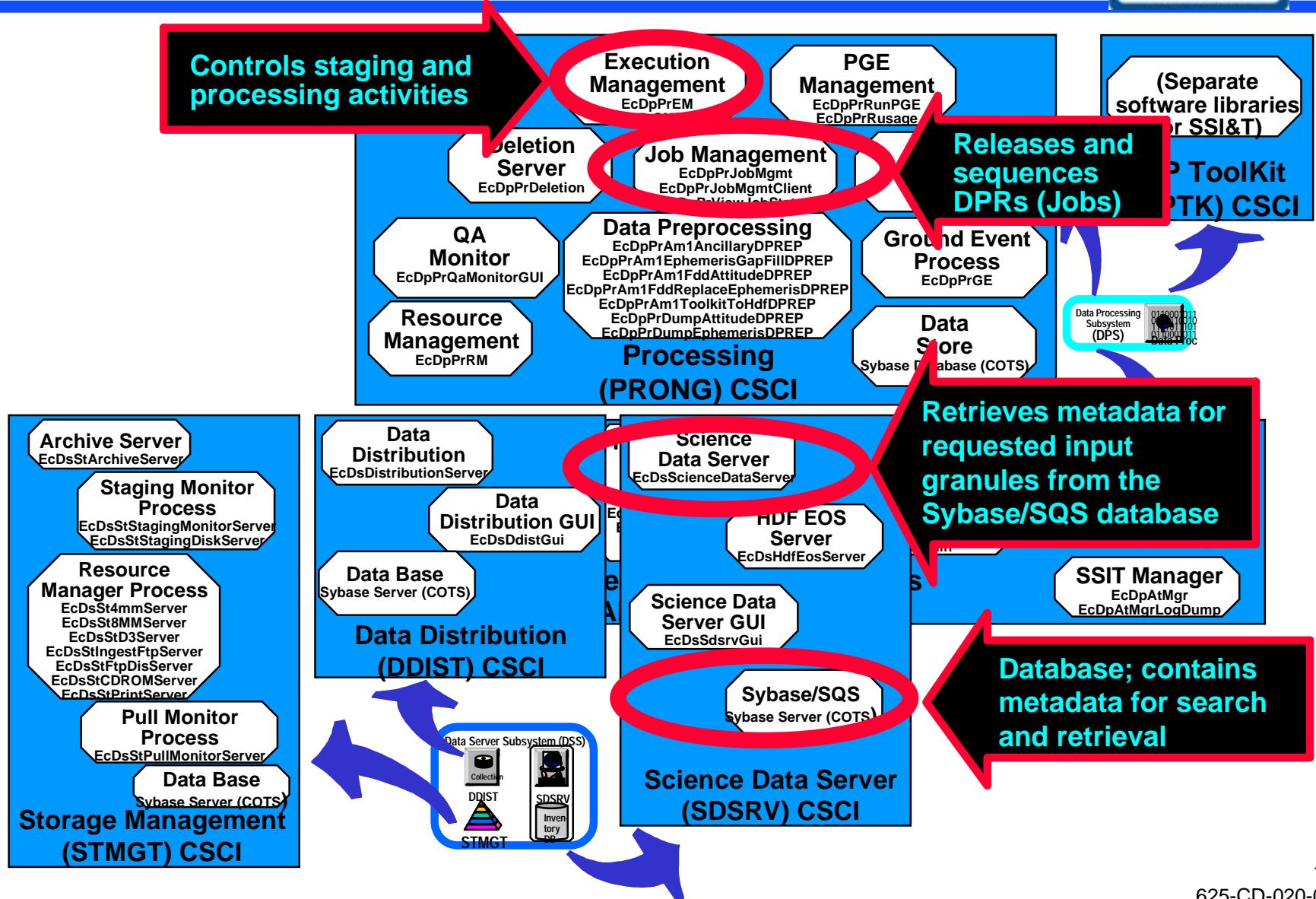
# ASTER: Input Data Location Process



ACT locates required AST\_L1BT (L1B TIR), AST\_ANC (ASTER ancillary data set), and GDAS\_0ZF (NCEP ancillary) input data granule.



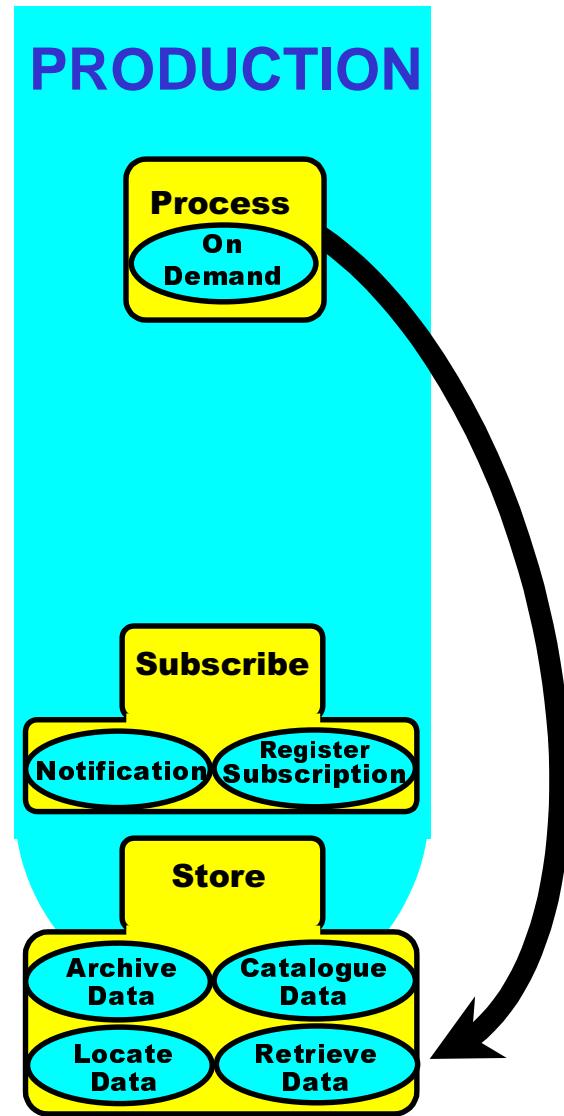
# ASTER: CSCI/Component Role in Input Data Location



# Backward Chaining (Cont.)



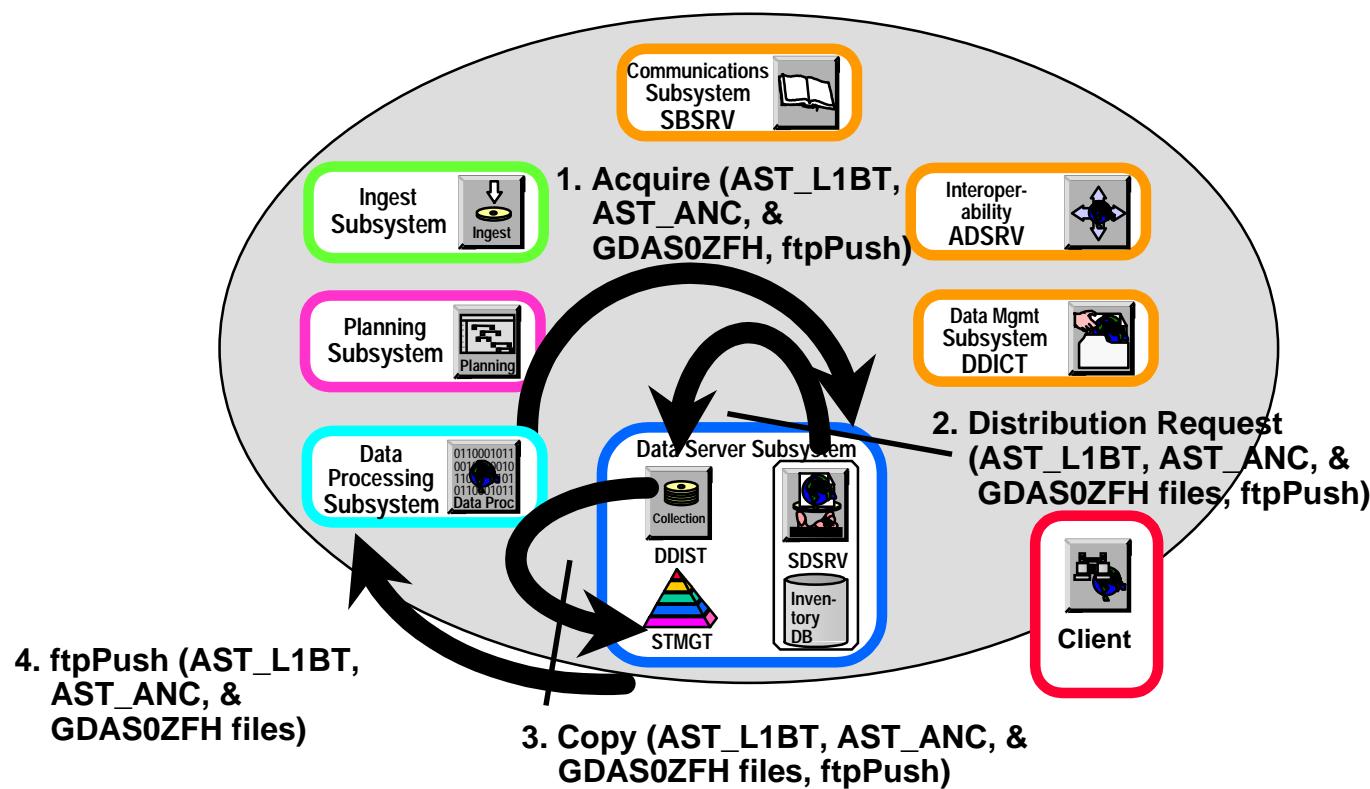
Retrieve  
AST\_L1B,  
AST\_ANC  
(ASTER ancillary  
data set), and  
GDAS0ZFH  
granules as input  
to ACT; PGE  
execution begins



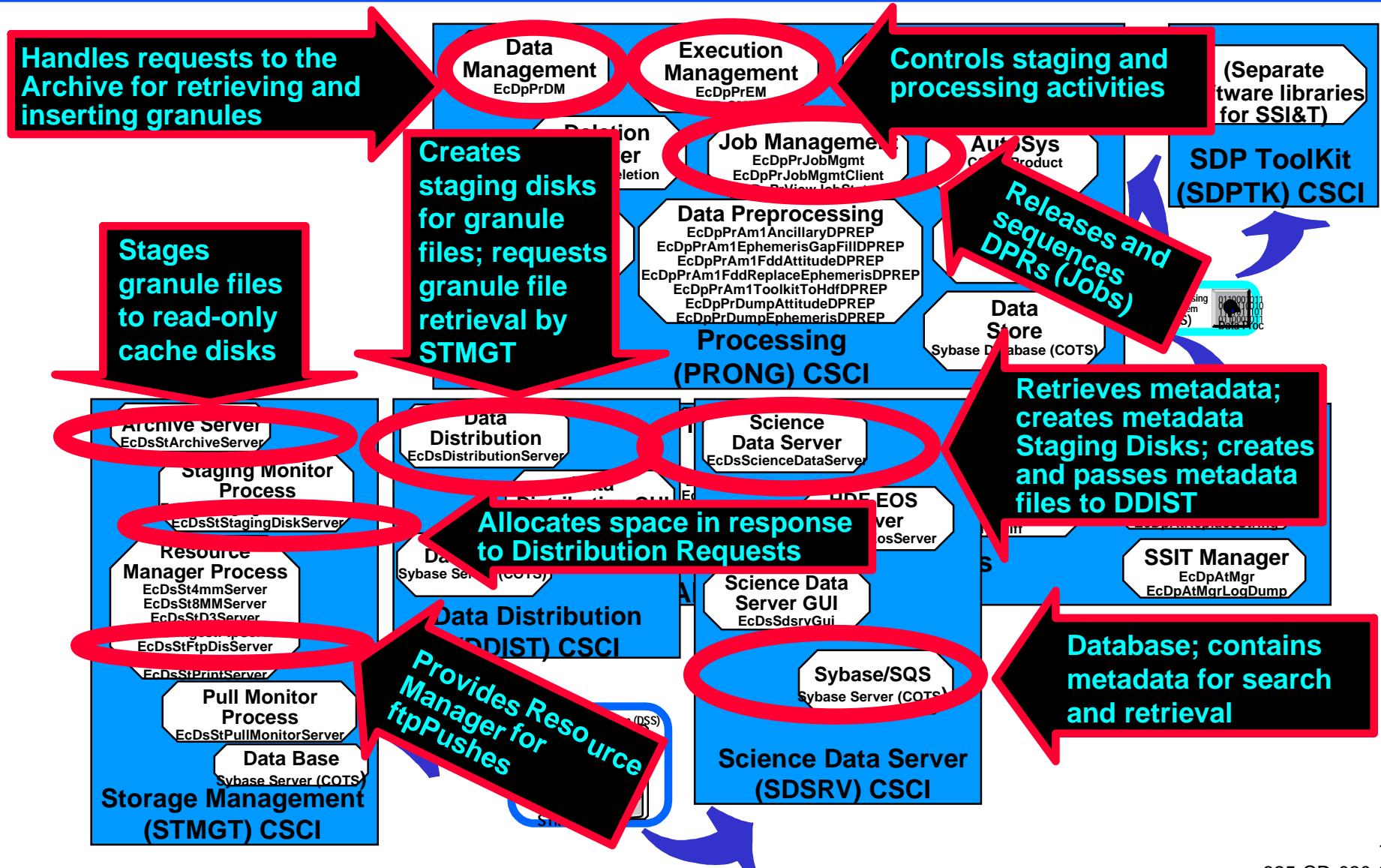
# ASTER: Job Staging Process



ACT production job retrieves required AST\_L1BT (L1B TIR), AST\_ANC (ASTER ancillary data set), and GDAS0ZFH (NCEP ancillary) input data granules.



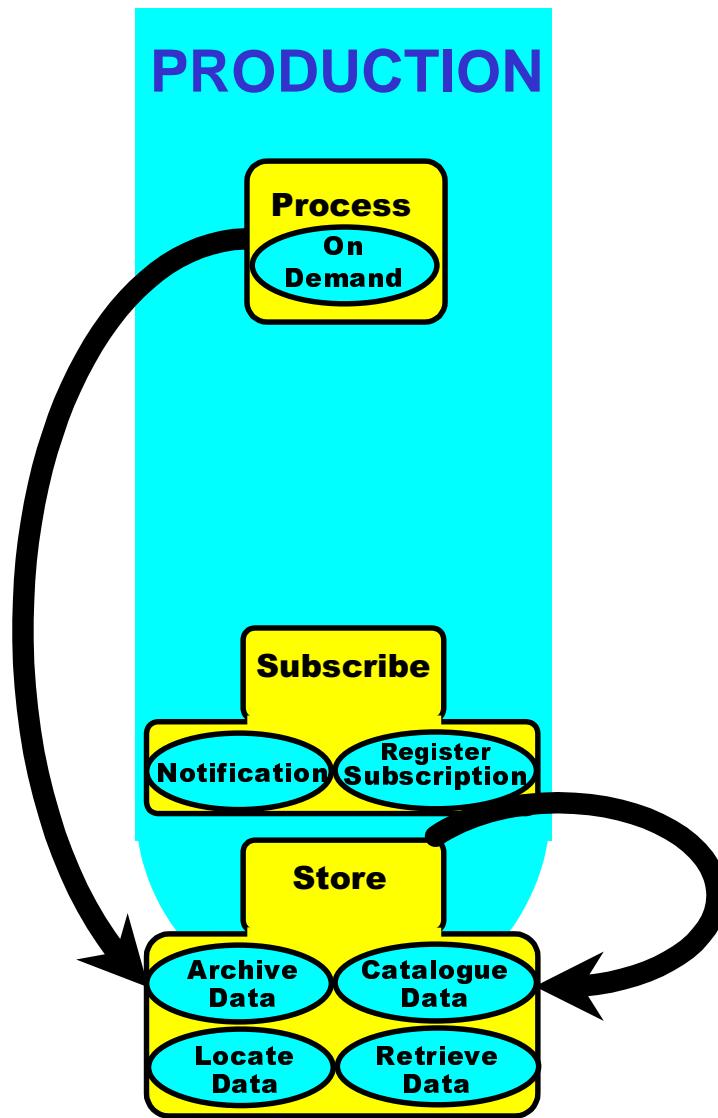
# ASTER: CSCI/Component Role in Job Staging



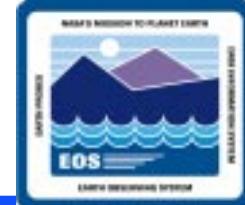
# Backward Chaining (Cont.)



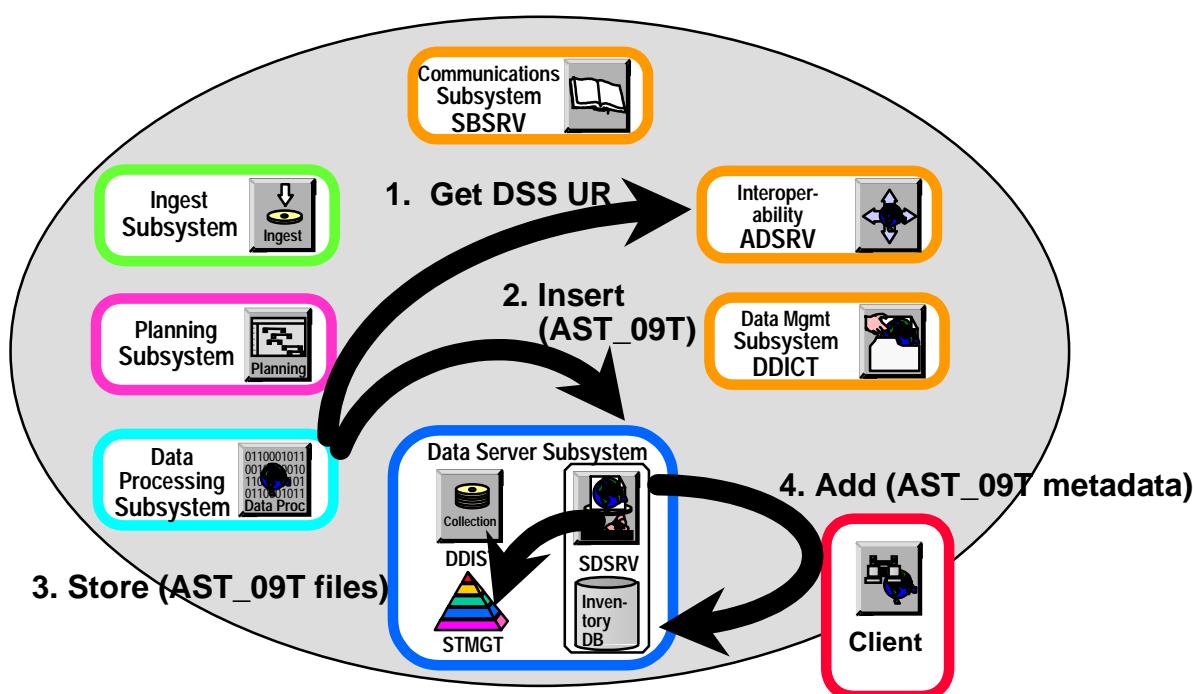
**Archive newly  
created AST\_09T  
(L2 Surface  
Radiance TIR)  
granule after  
completion of  
ACT PGE;  
update catalogue  
with reference to  
AST\_09T**



# ASTER: PGE Execution and Output Insertion Process



ACT PGE is successfully executed and newly created AST\_09T (L2 Surface Radiance TIR) granule is archived; inventory is updated.



# ASTER: CSCI/Component Role in PGE Execution and Output Insertion

